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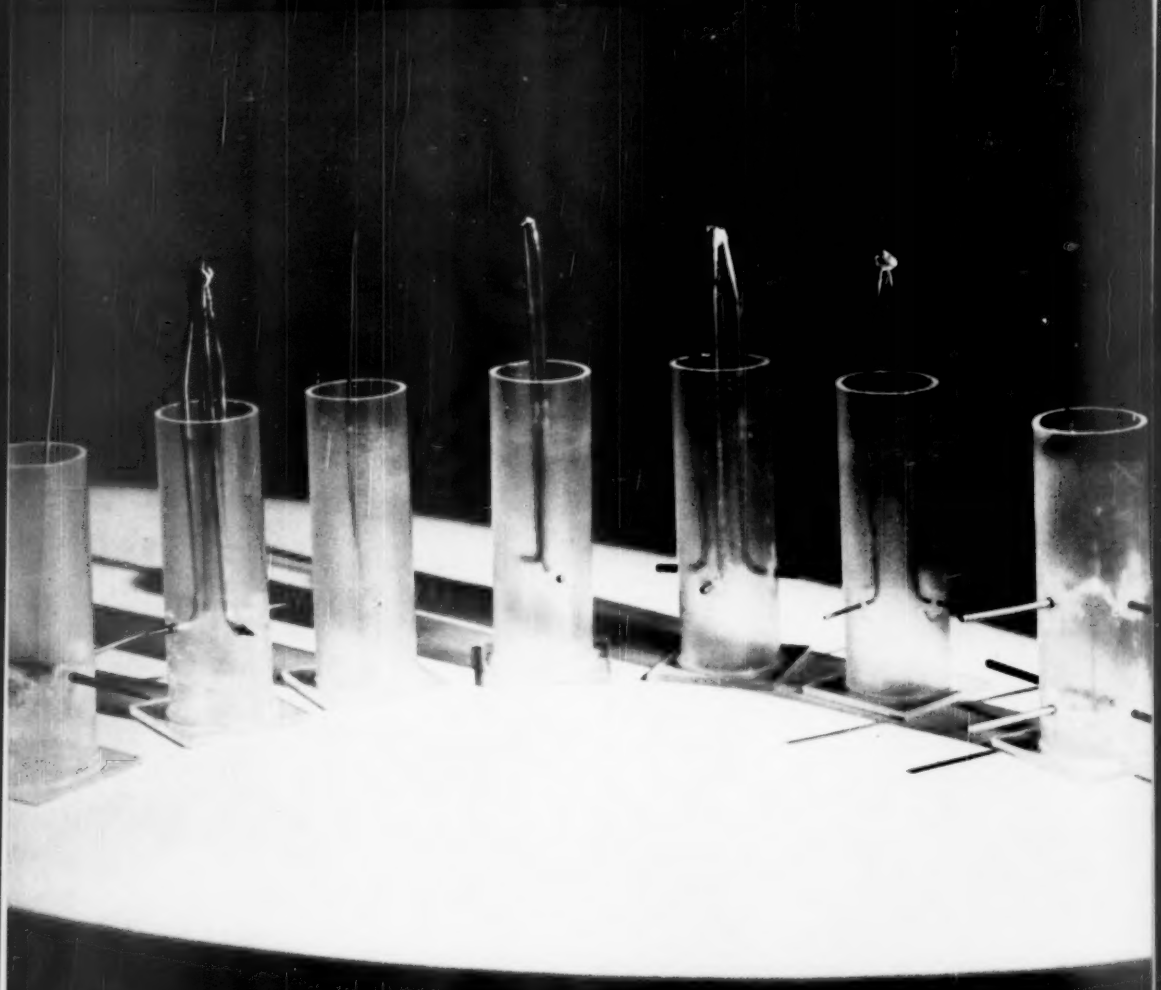
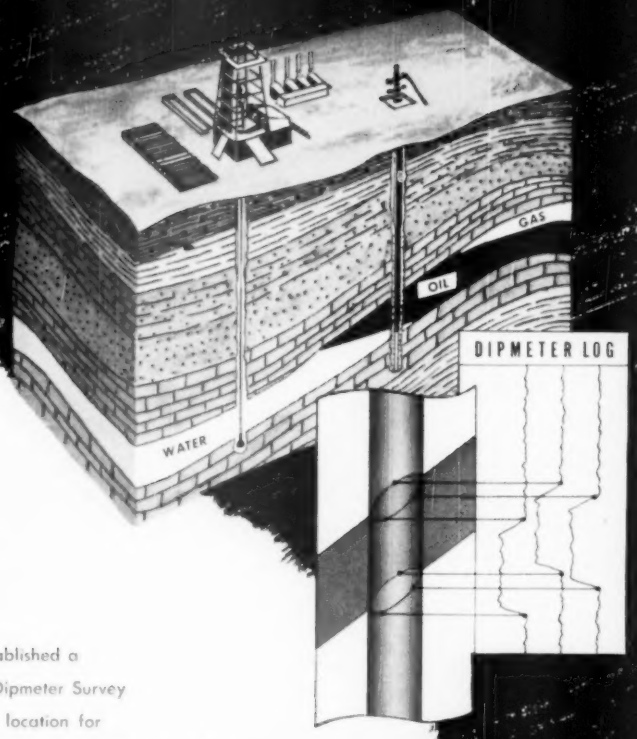


SECTION I

NOVEMBER, 1950

A Dipmeter



WOULD HAVE SAVED THE EXPENSE OF DRILLING THIS DRY HOLE

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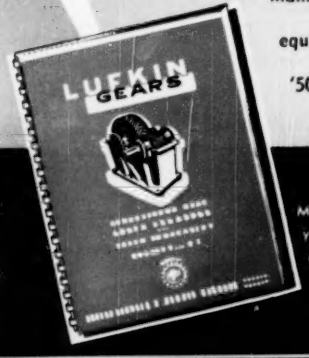

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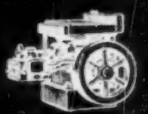
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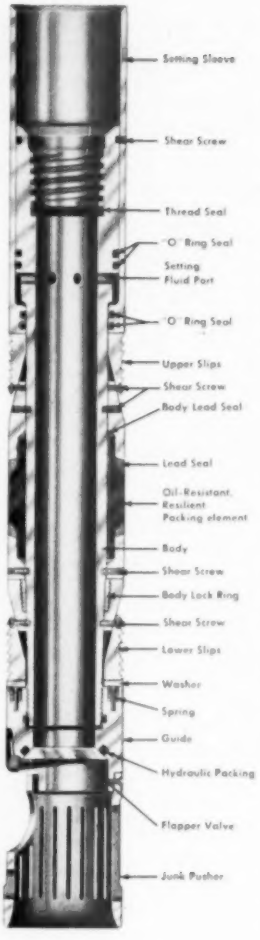
Get Better Results with this

Designated by an engineer-author as the "Universal Type," this packer not only takes care of the "every day" routine installations, but is adaptable to many applications previously considered either difficult or impossible.

The ability of this "Universal Type" Packer to cover such a wide range of applications is due fundamentally to the construction of the Packer itself. A Hycar packing element, retained by lead seals, is mounted between two sets of opposing slips so that the Packer virtually becomes a part of the casing; cannot be moved up or down the hole; and prevents fluid or gas from passing in either direction between the packing element and the casing. After the Packer has been set and the Setting Tool has been removed from the hole, only the smooth bore Packer (at right) is left in the well, securely packed-off, and ready for use of the proper Baker Packer Accessory Equipment to meet your specific well requirements.

Meets Varied Production Requirements

The Baker Model "D" Retainer Production Packer, with easily operated accessory equipment, has gained wide popularity because of its effective application to many needs in producing wells. It can be set and used for making a flow test, utilizing the Packer for production through the tubing if the zone proves productive. If not productive, the zone can be squeeze cemented through the Packer. A single Packer provides for production of two zones, either simultaneously with segregated production or from each zone separately at different times. For three-zone production only two packers are used.



Baker Model "D" Retainer Production Packer shown ready to run in the well, but prior to introduction of Setting Tool shown in Figure 1.

The Baker Retainer Production Packer is used for single-zone production to prevent gas from cutting holes in the casing (often started by thread leaks) by transferring the pressure from the casing to the tubing. If and when the tubing leaks, it can be pulled, repaired and replaced through the Packer. The Packer will protect the casing when corrosive fluid is being produced or injected, by permitting the annulus to be filled with oil and confining the corrosive action to the tubing only.

No Interference with Operations

While the Baker Retainer Production Packer virtually becomes a part of the casing and will not move up or down regardless of pressure from either direction, it still permits maximum flexibility of operations. When it becomes necessary to remove the tubing, the Flapper Valve in the lower end of the Packer closes to isolate the formation below, and later the tubing is readily replaced without disturbing the Packer. It is never necessary to pull rods or tubing under pressure.

Many Important Advantages

Let us consider the major advantages which make the Baker Model "B" Retainer Production Packer so economical, so easy and safe to run and operate . . . IT HOLDS BOTH WAYS – The Packer is anchored against either upward or downward movement by two full sets of opposing slips. This feature is always desirable, and is vital in gas-injection or water-injection wells where

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Baker "Universal Type" Packer

constant pulsation is present. SUCCESSFUL UNDER HIGH BOTTOM-HOLE TEMPERATURES – The oil-resistant Hycar packing element, combined with lead retaining seals, has proved in countless wells to be effective against high temperatures. IT IS CORROSION RESISTANT . . . with cast iron construction that is far more resistant to corrosion than the steel casing in which the Packer is set. THE TUBING IS FREE FROM THE PACKER . . . which permits unrestricted running and pulling of tubing and rods. NO SET-DOWN WEIGHT IS REQUIRED – When it is desirable, the tubing can be suspended in tension to permit dropping pressure bombs (and other devices) through the tubing. You are not handicapped by "corkscrewed" tubing often resulting when set-down weight is applied to conventional type packers. WORK CAN BE DONE THROUGH THE PACKER – Gun perforators, suction bailers, acid jet guns and other devices may be run through the Packer and past the Flapper Valve for any necessary operations below the Packer; and the tubing can always be run back through the Packer after such work is completed. The well can be plugged back with cement to a new bottom through the Packer. The Packer can be converted to a casing bridge plug, or cementing operations can be performed through the Packer as though a cement retainer were being used. IT IS COMPLETELY DRILLABLE – Because the major parts of this packer are made of cast iron, you will never have to "mill up" a Baker Retainer Production Packer.

Specific Recommendations Available

If you have any production problems which might be solved by the use of a Baker Model "D" Retainer Production Packer, we suggest that you contact the nearest Baker representative who will gladly furnish helpful recommendations. Send for your copy of the new brochure with many installation drawings; or see the Baker (and Composite) Catalog.

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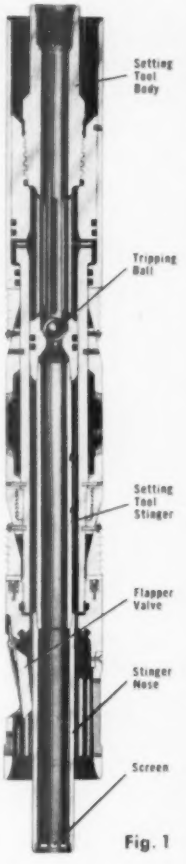


Fig. 1

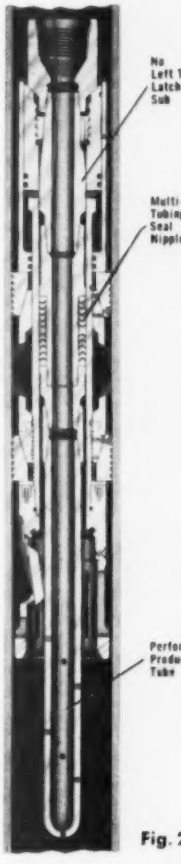


Fig. 2

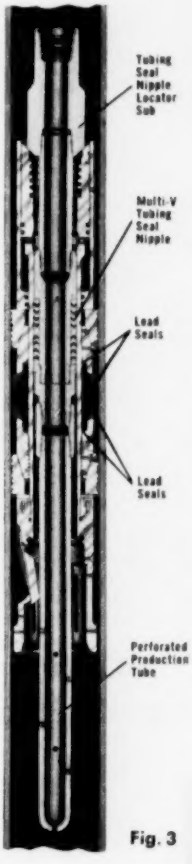
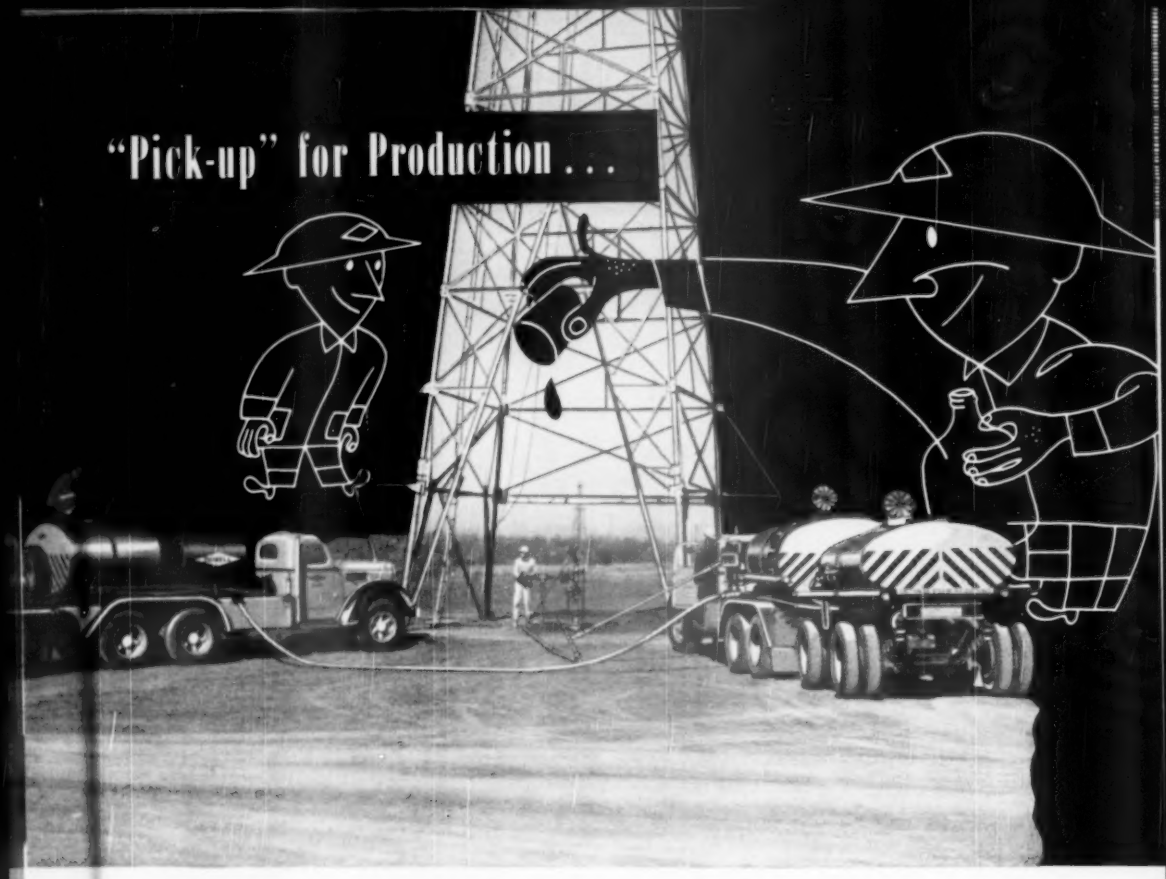


Fig. 3

FIG. 1.—Setting Tool for Baker Retainer Production Packer, equipped with Stinger Nose to hold the Flapper Valve open while running-in the well. After the Packer is set the Setting Tool is removed from the hole, followed by selection and use of accessory equipment as indicated. FIG. 2.—When it is desirable to suspend the tubing in tension in a single or dual-zone completion hook-up using one packer, the No Left Turn Latching Sub is employed. This unit does not effect a seal when seated, but provides definite assurance that the Multi-V Tubing Seal Nipple is properly positioned in the bore of the Packer and will not be moved up or down by contraction or expansion of the tubing. FIG. 3.—When it is desirable to apply "set-down" weight of the tubing string, the Tubing Seal Nipple Locator Sub serves as a locator (or marker) to assure proper positioning, and to prevent downward movement of the Tubing Seal Nipple.

In addition to conventional setting on tubing or drill pipe, WIRE LINE SETTING of the Baker Retainer Production Packer is available through several leading service organizations. Any Baker office or representative will furnish complete information.



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On the Cover — This month's cover picture was taken from the technical paper appearing on Page 309 of the Transactions Section. The paper, by James M. McDowell and Morris Muskat, has to do with formation penetration. The dramatic picture on the cover shows seven model well systems which have been penetrated beyond the casing.

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Editorial Comment—

MANAGEMENT . . . . HELP THE 'SPECIALIST'

By E. G. Gaylord

Vice-President, California Research Corp.

THE discussions, pro and con, which have been appearing in recent issues of the JOURNAL OF PETROLEUM TECHNOLOGY regarding "specialists" may well have been both confusing and disheartening to the young engineers, geologists and other technical personnel, particularly those who have been ambitious enough to pursue graduate work in our universities, thinking that by so doing they will better fit themselves for professional work in the petroleum industry. These discussions have proclaimed the need of well trained technical men and about this there appears to be no argument. The issue instead seems to deal with the qualifications and breadth of viewpoint of the "specialist." I think it would be well, therefore, to define this term "specialist," at least in the sense I propose to use it. Parenthetically I would not choose to use this word had it not been used in prior discussions since it is linked too closely with the term "expert," as well as with the builders of certain small structures often found on an oil lease. I think of a specialist as one who through academic training and experience has acquired the skills and judgment necessary to be proficient in a specific, although sometimes narrow, field of activity. To be skillful and proficient he must realize and practice within the limits of knowledge in his field and confine his necessary assumptions to those that are rational and acceptable. Unfortunately, some so-called specialists cannot meet these qualifications.

This business of finding oil and producing it in a manner to obtain the greatest ultimate production economically possible is one which can and should use the best talent our universities can train in the basic sciences of physics, chemistry and mathematics, as well as engineering applications of these sciences. Needless to say, however, the education of these men should not end when they leave the university. If the organizations employing them are to gain the most from such talent, they must assume the obligation of continuing that education to the end that both the organizations and the men will profit thereby. This requires intelligent and considerate leadership on the part of management, staff, and operating personnel of our organizations. How else can a young engineer grow in stature and wisdom and be made to realize he has an important part in "building a church and not just in laying stone." When the specialist has had such helpful guidance, he can be of great help to those whose responsibility it is to make the decisions.

THE necessary assumptions are today the great bugaboo of the production branch of the oil industry. One meets them on every turn, whether it is in geology, seismic exploration, reservoir engineering, or reserve calculations. More often than not a decision as to the reasonableness of many of the assumptions must be based largely on experience which the young engineer so often lacks. Many times it is a difference of opinion among inexperienced engineers with respect to assumptions that causes an engineering discussion to bog down. But the budding young specialist should not be blamed for this situation.

There is a great need to reduce the number of assumptions which must be made at present to solve most of the technical problems facing us in both finding and producing oil. This will be achieved, I believe, largely by the research efforts of specialists both in the laboratory and in the field. Management should encourage this research.

There is also equally as important a need for senior professional men and executives who can put the accomplishments of the specialists to intelligent use. While not necessarily specialists themselves, they must, nevertheless, be competent to exercise sound and mature judgment and guide the specialists in their chosen fields into useful accomplishments. These executives and senior professional men should know the limitations which must be exercised in extrapolations of limited laboratory and field data. The young engineer or scientist, if he is to develop into a successful executive, must therefore broaden his perspective as he gains experience in his own field so that he will appreciate the many facets of what may seem to the inexperienced to be a fairly simple decision — such as, for example, the location of an exploratory well. Whether the specialist will become a successful executive will depend not on the fact that he is a specialist, but rather on whether he has been able to broaden his perspective as he gains experience so that he is able to weigh intelligently all the facts involved in reaching a sound decision.

OUR industry, like most others contributing to the pattern of our industrial civilization, has gained its present stature through two principal factors, individual initiative and scientific achievement. Of these, the latter was by no means unimportant. As the oil industry becomes more mature and certainly more complex, scientific advance becomes of increasing importance. I believe that the continued growth of our industry depends in considerable part on its scientific progress. I believe further that this progress will only come about provided we are permitted to continue the free exercise of the competitive enterprise system. It would not under a system of planned economy or bureaucratic control. Who can doubt that the specialist has a role to perform in such scientific achievement?

Finally we must recognize that the public confidence and support are vitally needed by our industry. The engineer, or geologist, whether a specialist or not, should never lose sight of this fact, and he should assume a role that helps gain for the industry such confidence and support. He should be able to answer intelligently the questions he no doubt is frequently asked by those seeking information about our

Continued on Page 5, Section 2

The Significance of Recent
CANADIAN OIL DEVELOPMENTS

By John F. Fairlie
Imperial Oil, Ltd.

A Canadian Looks at His Country's Newest Oil Fields and Predicts Reserves of Between Five and Twenty Billion Barrels in the Western Canadian Basin.

BY THE end of this year the oil industry will have spent half a billion dollars in the Canadian Prairies since February, 1947. The event which initiated this expenditure was the discovery of an oil field at Leduc, 20 miles south of the city of Edmonton.

In the intervening three and one-half years some 1,700 producing oil wells have been drilled. New refineries have been built or are planned which together with the expansion of existing facilities will have tripled Prairie refining capacity, increasing it by some 80,000 B/D. A new crude transportation system 2,000 miles long will be in partial operation this fall delivering crude to Prairie refining centers by pipeline. It will be in complete operation in the spring of 1951 when Alberta crude will be moved by pipeline and tanker to the Ontario refining areas.

This record of achievement is a typical oil story in its magnitude, in the energy which has been expended in a short period and in the risks which have been successfully run. It is characteristic of the industry and of the system on this continent which rewards energy and enterprise.

In considering the significance of the new discoveries, it is necessary first to recognize the importance of oil to Canada and second to determine the relationship of this new supply to the industry operations. Oil is peculiarly suited to the solution of Canada's fundamental problems—in overcoming its long distance—in agriculture—in manufacturing—in mining—and in exploiting the great resources of the northern areas.

Canada is consuming currently approximately 350,000 B/D of crude and products. With a population of over 13½ million people this amounts to 9.1 bbl per capita per year. This is approximately 60 per cent of the United States per capita consumption of 15.2 bbl. Petroleum supplies the energy for some two and one-half million vehicles and tractors and it provides the fuel for a power burner or a space heater for one of every six homes. In addition, large amounts of oil are used in diesel and oil burning locomotives and in shipping.

In the last ten years, gasoline demand has doubled and heating oil demand has increased three and one-half times. From 1939 to 1949, total Canadian petroleum consumption increased 112 per cent as compared with 72 per cent for domestic demand in the United States, that is at almost one and one-half times the American rate of growth. Canada is placing increasing reliance on oil for its energy requirements and it is therefore particularly fortunate that important domestic reserves should have been discovered recently.

At the time of the Leduc discovery, more than 90 per cent of the country's petroleum requirements were imported from the United States and the Caribbean area. Exploration had been carried out over a long period in Alberta but, aside from a few small distillate wells and some wet gas production, no success was experienced until 1936 when an important crude discovery was made in Turner Valley, 40 miles south of Calgary.

The Turner Valley field developed rapidly to a peak of about 30,000 B/D but unfortunately its ultimate recovery had been affected by the loss of gas over a period of years. By 1947, Turner Valley had shrunk to between 12,000 and 15,000 B/D of production and its remaining reserves were estimated at 25,000,000 bbl.

In February, 1947, after having drilled 133 wildcat wells over a period of 30 years and after expending $23,000,000 in exploration, Imperial Oil Ltd. made the Leduc discovery 20 miles southwest of Edmonton (Fig. 1).

This field proved to have reserves of 250,000,000 bbl. It was followed in 1948 by Redwater whose reserves have been raised to roughly 500,000,000 bbl by recent extensions. In 1949 other important discoveries were made at Golden Spike and Stettler. Numerous small fields have been found which are overshadowed by the major discoveries but they are still important, not only for their production but because of the promise which they give of the future potential for the area. The Normandville discovery, around which much activity is now concentrated, is some 250 miles northwest of Edmonton.

Beyond this some 200 miles is Fort Vermilion around which currently there is considerable exploration activity. Beyond Fort Vermilion 600 miles is Norman Wells, a producing field north of the Arctic Circle, whose outlet is confined to a small refinery which supplies local needs. It is the field which supplied the Canol project.

In the last six weeks, three new fields have been discovered. Although their size has not been determined to date, it is quite possible that among them there may be a field of major importance. Acheson is seven and one-half miles west of Edmonton, Flint is 50 miles southeast of Edmonton and Big Valley is 90 miles northeast of Calgary. These various discoveries have increased Prairie oil reserves in a three and one-half year period from 45 million bbl to approximately 1.1 billion bbl. The activity which has produced this growth is illustrated by Table I.

Government Regulations

A factor which has played an important part in the speedy development of Alberta oil resources is the nature of the

Table I—Canadian Prairie Oil Development

	1946	1947	1948	1949	1950 Est.
Lease and reservation—mm acres	20	30	56	115	140
Geophysical parties	11	23	59	105	125
Exploration and development cost—mm $	12	25	50	100	150
Oil wells completed	59	196	249	580	700
Reserves—mm bbl	45	150	500	900	1,100
Production potential—MB/D	19	24	40	109	142

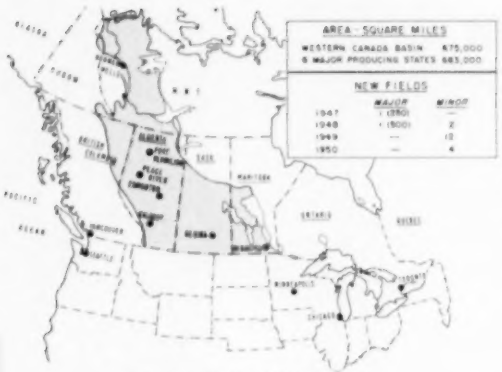

FIG. 1 — WESTERN CANADA BASIN

regulations under which the industry operates. In Alberta, unlike most provinces and states, 93 per cent of the mineral rights belong to the government. In order to encourage exploration, the provincial government adopted a policy some years ago of granting government reservations to exploration companies. These reservations may be retained for three years without converting to leases providing the company meets certain work obligations involving geophysical surveys, core and development drilling. If a discovery is made on government acreage, the discoverer must within three months make a selection of leases and return half the acreage to the province. The acreage which reverts to the province may, if the government sees fit, be put up for auction. The purchaser of these auctioned lands is required to carry out drilling operations within one year. The self-generating nature of these regulations has been an important factor in the pace of Alberta oil development.

Table 1 indicates the potential production at MER to be 142,000 B/D by the end of 1950, or 40 per cent of Canada's petroleum requirements. Despite the need for this oil, owing to high rail transportation costs, its utilization is currently confined to the Prairies until the completion of pipeline facilities. As a result, each successful well at the present time reduces what can be taken from the remaining wells.

The estimated oil situation in 1950 will assist in establishing the importance of the Prairie discoveries and their location with reference to the consuming areas (Fig. 2).

Canada is not a homogeneous area but is made up of four separate regions, each with distinct characteristics, each with a different type of economy, and each offering a different supply problem to the oil industry.

In the east, the largest concentration of capacity is located at Montreal, amounting to 130,000 B/D or approximately 40 per cent of the Canadian industry. This area is supplied chiefly with Venezuelan and Middle East crudes which are received by a pipeline from Portland and also directly by tanker in the summertime.

In Ontario the largest refinery is at Sarnia with a capacity of approximately 50,000 B/D which is supplied directly by pipeline from the Mid-Continent and Illinois fields. Other refineries are located in the Toronto area for which the general crude supply is imported from United States lake ports by tanker. Quebec and Ontario are the most highly populated areas in Canada, and are the major contributors to the national economy with their large manufacturing, agricultural, forestry and mining resources. The Prairies in 1950 are being supplied almost entirely from their own crude resources run in local refineries. However, a small volume of imports is still necessary owing to a lack of plant capacity.

Prior to Leduc the Prairies were a high cost area dependent on imported crude and products for the major share of their requirements. Two-thirds of these requirements were met from crude run in a network of small refineries ranging from 300 to 10,000 B/D capacity. Half the crude came from the Turner Valley Field in Alberta and the other half was imported by tank car from the Montana and Mid-Continent fields. The remaining third of requirements was supplied in product form through the lakehead from Eastern Canadian refineries running United States and Venezuelan crudes.

Transportation from the Mid-Continent to Regina costs roughly $2.50 per bbl so that crude laid down at over $5.00 per bbl. The cost of moving products from the head of the Lakes to Winnipeg is more than $2.00 per bbl. Thus, moving a bbl of product from Sarnia to Winnipeg or a bbl of United States crude to Regina costs roughly twice as much as it does to move a bbl of Middle East crude 8,000 miles from the Persian Gulf via the Suez Canal to New York.

With this background the importance, to this agricultural area dependent on farm mechanization, of passing from a deficit to a surplus crude area can be appreciated. As for British Columbia, refining capacity is relatively small and both crude and product are imported from California.

Alberta Crude Disposal

From this review of the method of meeting Canada's oil requirements several facts having a bearing on the disposal of Alberta crude are apparent:

1. Alberta has the only important domestic crude production and it is now producing approximately 20 per cent of the Canadian requirements. All other needs are imported, half coming directly from the United States and the other half from the U. S. dollar area in the Caribbean and Middle East. From a product supply standpoint the Prairies are now almost self-sufficient waiting only on refinery construction to achieve this end.
2. Sixty per cent of the petroleum requirements and refinery capacity and 60 per cent of the population is in Ontario and Quebec and this market is 2,000 miles east of Edmonton. Almost 40 per cent of Canada's refinery capacity is at Montreal.
3. Crude can be moved by tanker on the Great Lakes for only seven months of the year. This has an important bearing on storage requirements to receive winter pipeline movements and to provide for refinery running in winter. It is obviously uneconomical to operate pipeline or refinery facilities on a seasonal basis.
4. The current cost of moving Alberta crude to the West

M B D	WEST COAST	PRAIRIES	ONTARIO-QUEBEC	MARITIMES	CANADA
DEMAND	42	76	194	33	345
PRIME RUNS	26	71	181	22	300
PRIME IMPS	16	5	13	11	45

FIG. 2 — CANADIAN OIL SITUATION — 1950

Coast by rail is prohibitive. Further, the Canadian West Coast market is too small to be economically supplied by pipeline because of the magnitude of the investment required.

It became evident as Leduc was delineated and with the subsequent discovery of Redwater that sufficient crude existed to meet Prairie requirements and to justify an economic pipeline movement from the area. However, the first step was to expand Prairie refining capacity to meet the local requirements and to maximize crude outlet as quickly as possible. Since no refining capacity either in the United States or in Canada could be economically reached by rail, the second step of constructing a pipeline was urgent to draw off production which would otherwise suffocate the industry as fresh reserves were proved up and allowables were cut back. The outlook for a pipeline to the West Coast was discouraging. At the end of 800 to 1,000 miles of difficult and expensive pipelining through the Rocky Mountains lay the Vancouver market for some 30,000 B/D of light crude with refining capacity for only two-thirds of this. The normal supply for the area was California crude which laid down at Vancouver at approximately $3.06 per bbl. On the basis of a pipeline movement for the Canadian market only, the transportation costs were too high to be economically attractive to the Alberta producer.

To obtain an economical pipeline movement a large throughput was required of the order of 60,000 to 100,000 B/D. This volume could not be attained by exports to the United States because insufficient refinery capacity exists in Washington and Oregon. While Canadian oil could provide an incentive with a large crude movement for the re-location of refinery capacity from California to the northwest, the pipeline could not wait on such a development in view of the need for an immediate solution.

To the east on the other hand, a large market existed for some 70,000 B/D in the Ontario refineries at Sarnia and Toronto which could use the crude as quickly as it was made available. To enter this market it would be necessary to lay down crude of equivalent quality at the same cost as the normal United States supplies, or at $3.20-3.25 (U. S.) per bbl. This, less the transportation cost, would determine the field price in Alberta. Since the Prairie crude price was initially established at a level competitive with alternate supplies in the Prairie refining centers, a reduction in field price would be required.

Obviously it was essential that transportation costs should be kept to a minimum to preserve the field price at a level

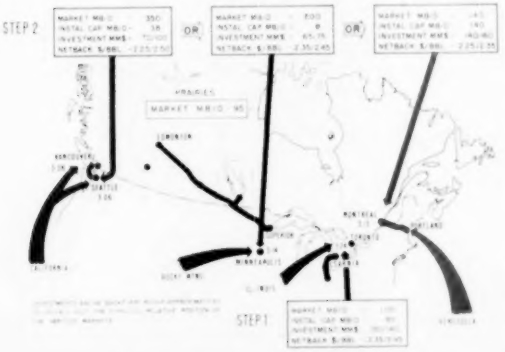

FIG. 3 — POTENTIAL ALBERTA CRUDE MARKETS.

competitive with other world producers so that Canada would maintain the maximum incentive for further exploration and development. This object of low transportation costs would be assisted first by traffic to Prairie refining points along the route, and second by the tanker movement which would permit a cheap and readily expandable connecting link between the lakehead and the Ontario destinations. Thus in the build-up period an immediate outlet could be obtained and as the movement increased further large and efficient tankers could be added.

In moving east the crude would pass a deficit crude producing area in the north-central United States. This area around Minneapolis and Fargo has little refinery capacity at the present time and is supplied by product pipeline from the Mid-Continent and Chicago areas. However, with the economic facts established by a crude pipeline there might be some inducement to American refiners to establish capacity and make use of the new Canadian crude.

Pipeline Nears Completion

The Interprovincial Pipe Line Co. was formed with the purpose of moving crude from the Edmonton area into refineries at Sarnia and Toronto in competition with their existing sources of supply from the Mid-Continent and Illinois fields. The pipeline, which is 1,096 miles long, will be completed in December of this year at a cost of approximately 90 million dollars. The route runs from Edmonton through or adjacent to the major Prairie refinery centers and terminates at Superior. The reason for terminating at Superior is that the Canadian terrain east of Winnipeg is like a rock sieve which would have been costly and time consuming to overcome. The pipeline's present capacity provides for meeting the crude requirements of the Prairie refineries at intervening points and for the delivery of 50-55,000 B/D of crude to the lakehead to accumulate one and one-half million bbl of crude in the wintertime at the average rate of 10,000 B/D, which will be moved in the succeeding open season of navigation. This will provide an average outlet of 35,000 bbl per calendar day for 365 days in the year and will permit meeting the crude requirements of one-half of the existing Ontario refineries.

Increases can be obtained by providing additional terminal storage to store crude pipelined in winter. Also by the addition of six pipeline stations deliveries to Superior can be increased to 90,000 B/D. The full requirements of the Ontario refineries can therefore be met when sufficient crude reserves are developed (Fig. 4).

Depending on the United States import duty following abrogation of the Mexican Trade Agreement the duty paid value of crude at Superior will be between $3.10 and $3.20 (U. S.) on the basis of a field price determined by the Ontario market. This may be sufficiently low to induce refinery construction at that point.

However, the total Superior tributary area in competition with Minneapolis is relatively small — probably not exceeding some 25,000 B/D. To lower the price at Superior at the present time by reducing the field price beyond that required for the Ontario market would not be attractive to the Canadian producer unless the increased outlet secured was larger than that offered by the Superior refining area.

As to the effect on continental supply lines the expansion of Prairie crude production obviously reduces Canadian imports from the United States and, therefore, impinges on the United States domestic industry. However, the volume is small, amounting in 1951 to less than two per cent of the United States requirements or to perhaps seven or eight per cent of the increase in United States demand over the period in which the Canadian development has taken place. It does not seem

realistic in this light and at the present time to look further to changes in hemisphere supply lines. It would seem that the development should be regarded as an adjustment within the continental area based on the assimilation of a new crude stream. The necessary adjustments in the overall supply situation are relatively small as compared with the increase in continental demand.

Looking to the longer term possibilities leads to some interesting speculations as to the place of Canadian crude in the continental energy picture. At the present time there are 90 geophysical parties in the field in Alberta and it is the second most actively prospected area in this hemisphere. It is surpassed only by Texas with 141 parties and considerably outdistances Louisiana in third place with 72 parties. The major oil companies of the world are participating in the play — Jersey Standard through Imperial, Socony-Vacuum, Shell, Gulf, Indiana, Texas, California Standard, Amerada, Phillips, Continental, and so on. There is a vast sedimentary area to explore which is favorable to the occurrence of oil. The attitude and regulations of the Alberta government encourage rapid development and exploration. Under these powerful circumstances it would seem reasonable to anticipate substantial discoveries in the future.

Based on past performance and the present level of activity it is quite possible that within the next few years 100,000 B/D of extra production will be available and seeking a market above that offered by the Prairies and the Ontario refineries. If this is so it is a volume which it is economical to move by pipeline (Fig. 3).

Fig. 3 illustrates, for purposes of orientation, the position of Alberta crude in various alternative markets. The data are based on rough estimates aimed at conveying the relative situation. Definitive estimates or changed circumstances may significantly alter the absolute relationships. The netbacks have been based on economical pipeline movements of 100,000 B/D. The tariff of $.17 reflects the assumed effect of the abrogation of the Mexican Trade Agreement. Market requirements have been arbitrarily placed on a 1955 basis.

The Ontario market on the basis of existing and planned capacity offers an outlet for 90,000 to 100,000 B/D. The netback indicated for Ontario determines the field price and this in turn will establish the value in other competitive markets. With the Ontario netback as a basis, an incentive may be provided to construct capacity in a market such as Minneapolis. Alternatively, if this does not provide the required incentive, it may be desirable to lower the field price to meet competition in the new market, if the additional outlet obtained compensates the producer for the lower field price. If this should occur, the new market would establish the basis and the delivered price to Ontario would be reduced below the competitive value with benefit to product prices in the area.

To expand the crude outlet further beyond that offered by Ontario and the area tributary to the lakehead terminus requires the development of a new market. The Pacific Northwest States are indicated to have a large demand equivalent to some 350,000 B/D of crude. There is no important refinery capacity in the area and it is currently supplied by products from California.

In meeting the current West Coast requirements, California production is being supplemented by small movements from District IV. On this basis with the present high level of demand, California reserves are being drafted at a rate higher than the United States national average. Some expansion in the effectiveness of reserves can probably be obtained by intensifying the level of refinery operations to obtain greater gasoline and distillate yields by the wider application of catalytic cracking and fuel reducing processes. Also the successful development of the tidelands might augment reserves. Despite these possibilities the opinion appears to be generally held that based on recent history California reserves will shortly be inadequate.

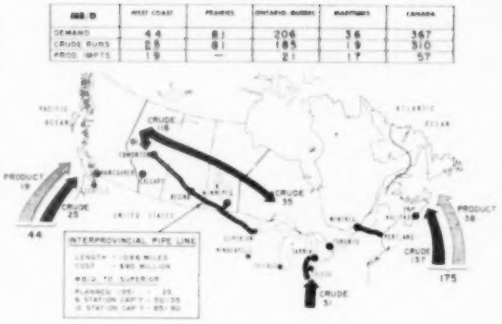

FIG. 4 — CANADIAN OIL SITUATION — 1951.

Future of Canadian Crude

The future of Canadian crude in the Pacific Northwest states is dependent on competitive factors. With a large volume pipeline movement based on a field price established by the Ontario market, it appears competitive with present supplies to the Washington-Oregon area. With the rapid growth which is taking place on the Pacific Coast additions to refinery capacity will be necessary and it appears logical to consider the location of some of this in the Northwest states, based on the pipeline movement of Canadian crude to this area and to British Columbia. The incentive to provide new refineries rather than adding incremental capacity in the California area would be that in addition to being competitive on the present basis it is consistent with the most economic pattern of supplies when and if California reserves become inadequate. At that time California will require substantial supplement from West Texas or District IV, and with a strengthening in the California crude price structure the competitive position of refineries in the Northwest states using Canadian crude would be improved as compared with supplies from California capacity.

Refinery construction appears desirable to meet the needs of this rapidly growing area and its logical and most economical supply would seem to be from a crude source 800 miles away rather than from West Texas through California, a distance of 2,000 miles.

A further factor which may influence the movement of Canadian crude to the Pacific Coast is the strategic consideration if it becomes desirable to provide for the supporting of military operations in the Orient from a Canadian source or, if for this reason, additional demands are placed on California.

The next market moving east is that adjacent to the Interprovincial Pipe Line in the Minneapolis area. This region which is now supplied by product pipe lines and has little refining capacity might support a refining industry running approximately 200,000 bbl of crude per day. As the movement of Prairie oil to the east is built up, the pipe line transportation costs for the large volume movement will be reduced. Depending to some extent on tariff developments Canadian crude may be in a position to offer an inducement attractive to such a refining industry on the basis of an Alberta field price established by the Ontario market. Alternatively, it may

Continued on Page 8, Section 2

Technical Notes

CARTER RESERVOIR ANALYZER TIMING CIRCUIT

W. F. BALDWIN, MAGNOLIA PETROLEUM CO., DALLAS, TEX.

The timing circuit generally employed in Carter Reservoir Behavior Analyzers consists of a synchronous motor driven cam which actuates a microswitch. A mechanically actuated timer of this type has several inherent disadvantages, among which are the following:

1. The first time interval may not be of uniform length, depending on the exact position of the cam at the conclusion of a previous run.

2. The positioning adjustments on the microswitch lever arms are critical and require periodic readjustment.

3. The mechanical system is subject to wear which will ultimately impair its accuracy.

It was therefore considered desirable to devise an alternate method which would eliminate these difficulties without introducing others that would be equally troublesome. This note describes the design of an electronic timing device which has been incorporated in the analyzer constructed by the Field Research Laboratories of Magnolia Petroleum Co.

The electronic timer circuit is built around a simple neon glow tube relaxation oscillator, the complete circuit diagram of which is shown in Fig. 1. The operation of the circuit is as follows: Condenser C_1 is charged to the critical firing voltage of the neon glow tube VR-75 by battery B_1 through resistors R_1 and R_2. When the neon glow tube fires, the condenser C_1 is discharged. The charging cycle then repeats itself, the repetition rate being determined by the values chosen for resistors R_1 and R_2, condenser C_1, and battery B_1. The transient developed at the instant the neon glow tube fires triggers the 2050 thyratron which in turn pulses the relay feeding the rotary relay ratchet circuits.

In practice, the following precautions should be observed:

1. Battery B_1 should be at least 135 volts, so that the firing voltage of the VR-75 occurs on the steep portion of the RC charging curve. This results in a more constant recurrent oscillation rate.

2. Resistors R_1 and R_2 should be wire wound. Resistor R_1 is variable to permit changing the time constant of the charging circuit and thereby the oscillation recurrence rate. In the circuit constructed, this was adjusted to 2.500 ± 0.003 seconds.

3. Condenser C_1 should be a good can-enclosed oil-filled type.

4. Stability of the oscillator can be improved by surrounding the neon glow tube VR-75 with a shield opaque to light.

In operation, the pulse generated by the relaxation oscillator triggers the grid of the 2050 thyratron. The current generated in the plate circuit of the thyratron actuates Relay Ry 1. The RC network in the plate supply of the thyratron is required to reduce the plate voltage of the thyratron to a value which will permit the grid to regain control. Condenser C_3 holds enough charge to keep relay Ry 1 closed for approximately 0.4 seconds after which time the voltage on condenser C_3 falls low enough to cut off the thyratron and permit the grid to regain control, which allows condenser C_3 to recharge through R_3. Relay Ry 1 has several sets of contacts, one set of which delivers the 2.5 second timing pulse. The contacts shown in Fig. 1 are used to discharge the condenser C_1 in the relaxation oscillator. This permits the use of small values of R and C in the oscillator circuit, thus improving stability. In actual installation of the circuit in the analyzer a locking circuit was provided through an additional relay. The locking circuit delays the actuation of the rotary switches in the analyzer until one pulse is generated in the timer circuit. This guarantees that the first period is always of proper length. Since the pulses recur every 2.5 seconds, the delay involved is negligible.

The circuit has been rigorously checked and found to have an inherent accuracy of one part in 1,000 under conditions of reasonably constant temperature and humidity. The circuit has none of the disadvantages of the mechanical system, but is influenced by ambient conditions involving high humidity. The circuit has been in operation for eight months and has required only a minimum amount of attention, largely associated with the aging of battery B_1. It is believed that the circuit possesses reliability and durability greater than that of the mechanical timer.

ACKNOWLEDGMENT

Acknowledgment is made to the management of Magnolia Petroleum Co. for permission to publish this note. ★

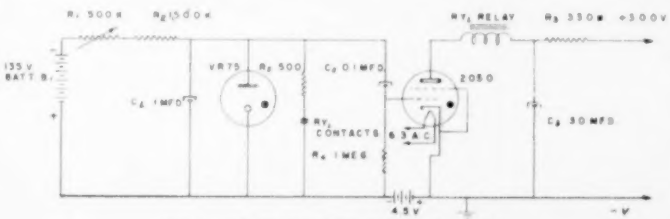

FIG. 1 — CARTER ANALYZER ELECTRONIC TIMER

HIGH PRESSURE MERCURY PUMP

J. R. SPENCER, TEXAS PETROLEUM RESEARCH COMMITTEE, UNIVERSITY OF TEXAS, AUSTIN, TEX., MEMBER AIME

When supplies of high pressure mercury or other liquids are required in analytical work, it is convenient to have the source of supply at a relatively constant pressure and available in sufficient volume to satisfy the requirements of the apparatus in use. It is also desirable that the pressuring device be as simple and as inexpensive as possible and convenient to operate. This pump combined with a small storage reservoir containing gas under pressure has the attributes of (1) positive control of the maximum output pressure through the use of a regulator in the low pressure air supply; (2) an increasing capacity as the rate of withdrawal of mercury from the pressured system is increased; and (3) simplicity, requiring only the use of a lathe, drill press, and welding unit in its construction.

DESCRIPTION

Essential parts of the pump are shown in Fig. 1. In appearance the unit is similar to the usual steam pump in common use in industrial applications although considerably smaller in size. The main differences lie in the area ratio of the air and mercury pistons and in the design of the air valve mechanism. Approximate diameters of these pistons are 4.25 in. to 0.375 in. respectively, giving an area ratio of about 130 to 1. The air piston (2) is attached to the end of shaft (4), with the mercury piston being merely a reduced extension of the shaft. Mercury intake and discharge to the pump are controlled by high pressure check valves that screw into the ports indicated at (6). Air supply is controlled by the valve assembly mounted on top of the main cylinder (1). The valve is of the sliding piston type, the piston (8) being perforated longitudinally to allow free passage to both ends of the cylinder (7).

A packing assembly was provided on the valve shaft to reduce air leakage to a minimum even though the resultant extra friction in the mechanism was not advantageous. Mounted on the valve shaft are two cam riders (13) and a stop, the latter stopping movement to the left when it strikes the post supporting the outer end of the shaft. Excessive movement to the right is avoided by the fixed stop on the cam support which acts against the back side of the right cam rider. The cam (12) pivots on a fixed beam and is actuated by fingers on the valve trip (11) which is rigidly attached to the main shaft of the pump. Tension springs (14), attached to the upper lobe of the cam, provide positive action to the valve which minimizes stalling under normal operating conditions.

OPERATION

Air enters the pump through the inlet port (10) into the valve cylinder (7), passes through the connecting tubing and main cylinder head and acts on the piston (2). Pressure in the air cylinder (1) increases until the pressure in the mercury end is sufficient to open the discharge check valve, one of the ports indicated at (6). When this critical pressure is reached the piston moves forward and the mercury end of the shaft (4) displaces mercury through the check valve. The end of the stroke is high when the finger on the valve trip (11) hits the cam (12) and rotates it past center. Just past center the tension spring (14) pulls the cam abruptly against the right hand cam rider (13) forcing the valve piston (8) to the right, simultaneously closing the intake port (10) and opening the exhaust port (9).

Pressure in the main cylinder decreases until the total pressure against the piston (2) is less than the tension in the return spring (3); the piston then returns to the original position drawing mercury from the supply reservoir through the intake check valve. As the original position is approached the opposing finger on the trip (11) strikes the cam which is brought sharply against the left hand cam riger (13), forcing the valve piston to the left and returning it to the intake position. The snap nature of the valve action will cause the cycle to be repeated indefinitely as long as the mercury discharge pressure is less than the maximum discharge pressure dictated by the pressure of the air supply.

Although the pump as installed is used intermittantly by hand control of the air supply it could easily be made automatic by the installation of a variable pressure regulator in the air supply line. The internal friction resulting from inaccurate machining and alignment of the component parts sometimes causes the pump to stall during slow operation at maximum discharge pressures above 5,000 psi. At lower pressures than this, the pump works satisfactorily and has done so during approximately six months of operation. Although the pump as designed is fully capable of producing pressures between 5,000 and 10,000 psi, it is believed that operation in this range would be greatly facilitated by altering the valve and cylinder to provide air powered return rather than the spring return now used.

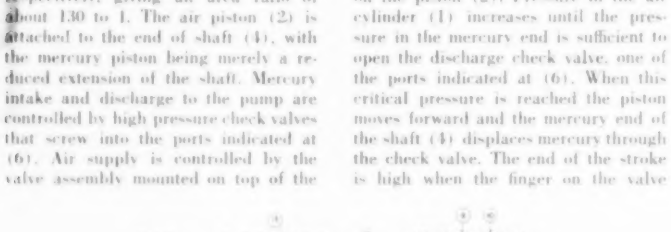

FIG. 1 — HIGH PRESSURE MERCURY PUMP.

ACKNOWLEDGMENT

The author wishes to express appreciation to the Texas Petroleum Research Committee and to G. H. Fancher, its director, for permission to publish this paper and to William E. Fickert for preparing the sectional drawing.

* * *

EAST TEXAS SECTION

Recent Developments in the Hydrafrac Process

By George W. Eaton, Jr.

The East Texas Section, meeting in Shreveport, La., October 17, in a joint session of the section and the Shreveport Geological Society, heard W. D. Owsley, vice-president of the Halliburton Oil Well Cementing Co., discuss recent developments in the Hydrafrac Process and other methods of increasing production.

For a year and one-half the Hydrafrac Process has been tried on some 1,600 wells throughout the industry with an increase of production being noted in 76 per cent of those wells treated. The majority of the Hydrafrac jobs to date have been conducted on wells in Oklahoma whose producing formations lend themselves aptly to the process. The next most active area has been in North Texas.

In recent months more factors which affect the probable degree of success which may be expected of the Hydrafrac treatment have become available and it is expected that in the future an even higher percentage of wells treated by Hydrafrac can be expected to be successful in increasing production. It was stated that the only advantage in using Hydrafrac is to create new permeability from the reservoir into the well bore. Obviously, if a formation has a high permeability and the reservoir is in the depletion stages with a low bottom hole pressure, then Hydrafrac will not be successful in restoring a prolonged increase in production. Under other circumstances when the permeability of the reservoir is low and considerable residual oil remains in place after some depletion has taken place, then Hydrafrac, by creating the permeability to the well bore will both increase producing rate and ultimate production from that well.

It has been learned that the isolation of the formation to be treated is particularly important. In other words, to treat an open hole section which contains both shale and sandstone by

WILLIAM D. OWSLEY
Outlines Hydrafrac Process

setting the packer at the bottom of the casing string is very unlikely to be successful in creating the fracture in the sand formation. The isolation of the sands from the shale is almost essential for any certainty of success. Since Hydrafrac has been introduced to the industry many wells are initially completed specifically for a Hydrafrac treatment in that casing is set through the producing formation and small isolated sections within the formation are selectively perforated so that individual Hydrafrac treatments can be made on each perforated interval. By so confining the Hydrafrac fluid to the specific interval to be treated a larger percentage of successes can be expected.

The principal changes in the technique have been in the gel mixing fluid. When Hydrafrac was first introduced it was customary to use crude oil with the Napalm to form a gel. It has since been found that a gel is more easily formed, with a lower per cent Napalm being required to obtain a gel of equal viscosity, when the gel mixing fluid is some of the higher hydrocarbons, such as gasoline, kerosene, or fuel oil. It has also been found that while a sharp break in pressure is desirable in most instances for certainty that the formation has been fractured, a sharp break is not absolutely necessary for a successful Hydrafrac. In fact, in many cases it is more desirable to have a slow decrease in pressure while the fluid is being injected than to have a sharp break from the maximum pressure. It is still considered desirable to use crude oil for the gel breaker solution in most instances as the gel breaker mixes equally well with gasoline, kerosene, or crude oil and crude oil is usually much less expensive than the other two fluids.

The latter part of Owsley's talk was devoted to the new Morflo chemical which has been used in recent months to increase the oil production from wells where it was felt a water block existed in the vicinity immediately adjacent to the wellbore. For a considerable period of time, much conjecture has been made about the possibility of a water or emulsion block actually occurring in the formation. Morflo, in order to be effective in producing the results and increasing oil production, is a chemical which is a very powerful emulsion breaker and also an extremely powerful surface tension reducing agent. Its discovery in the laboratory was purely accidental and while its exact action within the formation is not known, it is known that in many wells the flush treatment by Morflo has materially increased production. In some cases a marked increase in production has been noted.

Since Morflo has been used in a comparatively few wells as compared to Hydrafrac, statistics on the probable degree of success and the number of successes obtained are few as compared to the results of Hydrafrac treatments. Like Hydrafrac, Morflo has been tried in many areas with good results in each area in some cases and failure in other cases within the same area. ★ ★

PACIFIC TECHNOLOGY GROUP

Secondary Recovery

By Milan G. Arthur

Norris Johnston, president of Petroleum Technologists, Inc., continued the Pacific Technology Group's current series on secondary recovery Sept. 25 with a discussion on laboratory studies and an elaboration upon the techniques of testing and upon the application of the test data to evaluation of the recovery of oil anticipated under water flooding operations. Sixty-five members and guests attended the session in the General Petroleum Corp. auditorium in Los Angeles.

Johnston pointed out that porosity is measured either in terms of total porosity or effective porosity which includes the volume of only those pores which are interconnected and can contribute to the movement or expansion of fluids during depletion of the reservoir. In California sands the total porosity is generally equal to the effective porosity. Data on porosity are used to estimate reservoir volume.

Permeability of porous reservoir rock is measured in various ways and as a result there are various types of permeability such as those measured by dry air, oil, water and the effective permeability to one fluid phase when other fluids also exist in the pores of the rock. Permeability to air can be measured at least effort and expense, and air permeabilities are particularly valuable because of the large amount of interpretive correlations which have been developed from millions of these air permeability measurements.

Precautions must be taken in determination of single phase oil or water permeability in order to obtain significant results. Oxidation of crude oil can affect measurements of permeability to oil, and oxidation appears to be increasingly troublesome with low gravity asphaltic type crude oils. Measurement of water permeability is complicated by the reaction of water with some of the argillaceous materials contained in the rock and by the effect of bacteria which may accumulate in the water flowed through the rock.

Permeability measurements are employed to determine the important reservoir characteristics such as uniformity, mobility of oil, permeability profile of the formation penetrated by the well, choice of drilling fluid and choice of injection water composition. Each of these items was discussed by Johnston. It was pointed out that injectivity index which is a measure of ability of an injection well to take water at a given imposed pressure is not always directly related to the average measured permeability of the formation penetrated by the well.

Measurements of variation in permeability in different directions parallel to the bedding plane are increasingly applied to evaluation of water flooding operations. These data may permit the utilization of different well spacings in transverse directions and reduce appreciably the cost of drilling.

Saturation tests are performed by retorting the sample under high temperature or by reflux distillation as in the A.S.T.M. method. The A.S.T.M. method has the advantages of preserving the sample so that tests of other properties can be subsequently performed on the identical sample, of avoiding the coking of oil contained in the sample, and of elimination of application of a correction factor to account for the water of crystallization which is driven off in the retort. Saturation and ratios of oil and water saturations have been extensively correlated in many oil fields with relative production rates of oil, water and gas, and these data have been extremely valuable in well completion programs. Saturation data are also used to interpret the performance of oil base drilling fluid and to determine the amount of oil in place in the reservoir prior to water flooding.

Interstitial water contained in the rock is frequently measured in the laboratory by capillary displacement methods. These include displacement of water by air and by oil. The use of oil to displace the water generally gives more consistent results. Another method employed is the displacement of air by mercury but it is believed that this method should be utilized only for reservoirs where the method has been checked against measurements with the water-gas or water-oil displacement methods.

Interstitial water data are used to estimate reserves of oil and to evaluate the effect of water content on oil recovery by flooding. Capillary displacement tests of interstitial water content have been compared with water content determined by water saturation of cores taken with oil base drilling fluids. Although there seems to be no fundamental objection to the oil base core method it has been found that in some fields there is a difference in the interstitial water measured by the oil base core and capillary displacement or restored state methods. Where differences have occurred in California it has been found that the water content varies less with change of permeability for the oil base core method. The opposite has been found to occur in some reservoirs located in the Mid-Continent area.

In addition to the foregoing routine tests other tests discussed by Johnston were classified as research tests although he noted that some of them are performed on a rather routine basis. The flooding of fresh cores in radial and linear flood pot tests was discussed.

These tests determine important factors in evaluating flooding performance and economics such as mobility of oil, the history of oil and water production, the recovery factor, the effects of injection pressure and rate of flooding on recovery of oil and the required control of water quality and composition. Where extensive flood pot tests have been performed it has been found that the results determined maximum oil recoveries and it is contended that the results are within the range of twice the actual recovery to an amount equal to the actual recovery. This is considered to be a very satisfactory correlation.

Other items discussed by Johnston were the determination of whether cores were preferentially wet by oil or by water, the flooding of laboratory cores by capillary and by dynamic displacement, the effect of intermittent gas injection to increase oil recovery by partially accomplishing selective plugging of the most permeable watered out portions of the rock, the application of measurements of pore size distribution by mercury injection, water analysis, use of additives to control and improve water quality, measurement of formation factors to assist in interpreting electric logs, and tests on consolidation of sand. ★ ★ ★

Fifth Annual Joint Meeting of Texas Local Sections To Be Held Dec. 1, 2

The Fifth Annual Joint Meeting of all Texas sections of the Petroleum Branch, AIME, will be held Dec. 1 and 2 at Texas Technological College in Lubbock with the Texas Tech Student Chapter acting as host. Participating groups will be the South Plains Sub-Section, Permian Basin Section, East Texas Section, Gulf Coast Section, North Texas Section, San Antonio-Austin Sub-Section, Southwest Texas Section, Texas A&M College Student Chapter, University of Texas Student Chapter and the Texas Tech Student Chapter.

Registration and distribution of preprints will begin at 8:30 a.m. Dec. 1 in the Agricultural Building auditorium at Texas Tech. Fees will be $3 for members and $4 for non-members. Student registration will be complimentary but $1 will be charged for preprints.

The general session will get under way at 10:00 a.m. with an address by D. M. Wiggins, president of Texas Tech. D. A. Hulcy, of Dallas, president of the Lone Star Gas Co. and vice-president of the American Gas Association, will speak on "Team Work Pays Dividends." He will be followed by Harold L. Hensley of Humble Oil and Refining Co., Midland, with a talk on "Joint Development of the Oil and Gas Industries." W. L. Ducker of Texas Tech will be chairman of the morning session Dec. 1.

The afternoon session, to get under way at 1 p.m., will hear Max K. Watson, natural gas consultant of Amarillo, speak on "The Future of the Engineer in the Natural Gas Industry." Henry W. Hinkle, Stanolind, will talk on "Electric Oil Field Pumping" and C. Williams, Jr., of the Honolulu Oil Corp., Midland, will discuss "Recent Progress in Scheduling Flow of Oil and Gas." The session will be concluded with a student technical paper contest in which students from the University of Texas, Texas A&M, and Texas Tech will compete. Chairmen for the session will be Harry H. Power, University of Texas, and E. B. Armstrong, Honolulu Oil Corp., Midland.

A banquet will be held at the Hilton Hotel in Lubbock beginning at 7:30 p.m. Dec. 1. Doyle McClennon, president of the Texas Tech Student Chapter, will act as toastmaster. An address by Ernest O. Thompson of the Texas Railroad Commission will be given.

The third session of the joint meeting will begin at 9 a.m. Dec. 2 with an address by David B. Schulz of George P. Livermore, Inc. Subject will be "Training an Engineer in the Drilling Industry." Following will be a talk on "Modern Developments in High Pressure Pipe" by George A. Whetstone of the Civil Engineering Department at Texas Tech. The meeting will be concluded with a paper on "Factors Affecting Primary Cementing of Casing in Rotary Drilled Holes" by Waldo L. Grossman of Halliburton Oil Well Cementing Co., Midland. Chairmen for the session will be William N. Little, Blackwood and Nichols Co., Midland; and Phillip Johnson, Texas Tech.

Committee chairmen and members for the meeting include: program, Alden S. Donnelly, chairman, E. B. Armstrong, Bruno Scharbarum and R. S. Dewey; arrangements, W. L. Ducker, chairman; publicity, C. R. Bowen, chairman for the Panhandle District; H. E. Chiles, Jr., chairman for the Permian Basin District, and J. Ed Cooper; entertainment, R. C. Tucker, chairman; and registration, Philip Johnson, chairman, Dan A. Bee and Don Losher. ★ ★ ★

SOUTHWEST TEXAS SECTION

Round Trips to 10,000 Feet

Since the closing days of World War II when deep drilling came in for considerable more accent in the search for greater oil supply and reserves, problems have arisen to challenge drilling engineers. High among such problems was how to conserve time and energy while making round trips to depths of 10,000 ft. Some estimated that the procedure consumed 13 per cent of the entire drilling time.

Last month, Martin E. True, equipment research engineer for Humble Oil and Refining Co., in Houston, Tex., told 124 members and guests of the Southwest Texas Section what he and his associates are doing to meet this challenge. He explained the improvements being made in the construction and operation of the walking feed-off air brakes, power tongs and rackers, travelling block deflector and propeller type mud mixer.

On Humble's Rig 30 between West Columbia and Bay City, Tex., new techniques are being tried out. Eight oil and three gas producing zones lie beneath the area at a depth of nearly 10,000 ft. In the development of power tools, 10,000 ft of pipe can be pulled, stacked and rerun with only a minimum of human energy expended. Since April, 1950, a remote control pipe-racker and power tongs, developed in a joint venture, have been in operation on Rig 30. The remote control equipment makes round trips easy. One notable improvement — a hydraulic motor atop the tongs replaces the spinning chain for spinning pipe up with a large hydraulic cylinder applying pressure for loosening or tightening connections.

Newest addition to Test Rig 30 is a mud mixer which speeds addition of dry mud materials into the drilling mud. The mixer is driven by a 10-horsepower turbine.

True also described Humble's walking feed-off air brakes which regulate the rate of feed-off of the drilling line. The apparatus gets its name from the alternate action of the two air brakes on the drawworks drum.

A traveling block deflector on Rig 30 is operated by compressed air. An actuating cylinder deflects the block with small wire lines from a carriage. The block is kept three feet off center as high as the monkey board.

Following True's presentation, Paul Turnbull, vice-president-elect of the Branch, reported to the section on the Fall Meeting in New Orleans in October. ★ ★ ★

291 MEMBERS AND GUESTS ATTEND ANNUAL FALL MEETING IN LOS ANGELES

The Petroleum Branch Fall Meeting in Los Angeles Oct. 12, 13 attracted 291 AIME members, students and guests with 11 technical papers presented in four sessions. The papers dealt, primarily, with reservoir engineering with drilling fluids getting secondary attention.

The meeting was held in the spacious Los Angeles Elks Club near Westlake Park. Luncheon meetings were held in the nearby Town House Hotel within walking distance of the sessions. New officers for the Pacific Petroleum Chapter, host for the meeting, were announced October 12. They are Basil Kantzer, chairman, replacing N. van Wingen; R. L. Parsons and Charles R. Dodson, new councilors, replacing T. S. Mitchell and H. J. Clark; and Paul Andrews, L. W. Chasteen and F. L. Wadsworth, councilors whose terms have not expired.

AIME President Donald H. McLaughlin spoke to a luncheon meeting Oct. 13 of the Southern California Local Section in the Town House Hotel. President McLaughlin lauded the Section as an example of cooperation between the three AIME Branches. Although the Section is made up of a majority of Petroleum Branch members, the Mining and Metals branches are similarly active and growing. George D. Dub, chairman of the Section, presided at the luncheon meeting. Final social event of the meeting was the Annual Banquet held this year in the Rendezvous Room of the Biltmore Hotel.

The meeting was opened Oct. 12 by General Chairman H. N. Marsh. R. L. Parsons and Irving Dagan presided over the first session which heard the following papers read: "Relative Permeability Studies," by I. Fatt and H. Dykstra; "Steady Flow of Two-Phase Single-Component Fluids Through Porous Media," by Frank G. Miller; and "Applications of Differential Thermal Analysis to Petroleum Reservoir Problems," by Paul Romo.

The afternoon session consisted of the papers "Relaxation Methods Applied to Oil Field Research," by H. Dykstra and R. L. Parsons; "A Surface Indicating Pressure, Temperature and Flow Measuring Instrument for Logging Subsurface Well Conditions," by M. B. Riordan; and "Special Considerations in Predicting Reservoir Performance of High Volatile Type Oil Reservoirs," by Alton B. Cook.

Papers presented on the second and final day of the meeting included "Mud Loss to Formation Pores," by Charles C. Wright and Carrol M. Beeson; "Mineralogical Studies of California Oil-Bearing Formations," by W. C. Merrill, A. Grenall, P. G. Nahin and R. S. Crog; "Iranian Gums as Treating Agents for Drilling Fluids," by George Tchillingarian and Carrol M. Beeson; "Experimental Studies on the Characteristics of Electrochemical Potentials Encountered in Drill Holes," by L. de Witte; and "Citizenship and the Engineer," by A. C. Rubel.

Those responsible for the success of the Los Angeles meeting are Marsh, general chairman; N. van Wingen, immediate past chairman of the Pacific Petroleum Chapter; R. L. Parsons, program chairman; Herman Schaller, exhibits; R. D. Townsend, Jr., arrangements; E. A. Galvin, luncheon; John R. McMillan, dinner dance; and J. F. Alexander, publicity. ★ ★ ★

MISSISSIPPI SUB-SECTION

Use of the MicroLog

By Sam J. Poythress, Jr.

The MicroLog was described at a meeting of the Mississippi Sub-Section as a new electrical logging technique which measures the resistivity of a very small volume of material near the wall of the borehole by Aime Claudet, Southeast Area manager for Schlumberger in New Orleans.

In conventional electrical surveys the SP (self potential) log is used to detect permeable zones and the resistivity logs are used to determine fluid saturation within the rock. The MicroLog has five uses: (1) locate permeable zones; (2) determine exact amount of permeable sand; (3) make detailed study of pay for repressuring or other secondary recovery; (4) help in completion problems; and (5) means of measuring in place effective porosity.

In MicroLogging, three electrodes spaced one in. apart in a rubber pad are pressed against the wall of the borehole with a pressure of 50 to 100 psi so that the effect of the mud and the borehole are largely eliminated. In this manner two normal resistivity curves are measured simultaneously with spacings of one in. and two in. These curves are influenced by a small volume of material near the borehole, the longer spacing being affected by the greater volume of material. When the MicroLogging sonde is opposite a permeable bed, the smaller spacing is more influenced by the resistivity of the mud filter cake while the larger spacing is more influenced by the invaded material behind the filter cake which gives rise to a "departure" or separation between the two curves.

A new scale for recording the MicroLog has been introduced, 60 in. = 100 ft. which enables a detailed study of each ft of pay and will detect changes only a few inches thick.

The MicroLog can also be used to select sidewall coring points more economically.

J. K. Wright, Mississippi Oil and Gas Board, Jackson, presented Claudet to the members of the Mississippi Sub-Section at a regular dinner meeting at the Inez Hotel, Brookhaven, October 20. Wright is first vice-chairman of the Sub-Section and presided in the absence of H. B. Leeton.

A nominating committee was appointed to choose a slate of candidates for 1951 with Sam Poythress, Gulf Oil Corp., Laurel, Miss., chairman. Other committeemen are John Kiser, Lane-Wells, Natchez; Frank Kokesh, Schlumberger, Jackson; Jack Jackson, Sun, Brookhaven; Eugene Burnet, Oil and Gas Board, Jackson; William Hunter, California Co., Natchez.

A social meeting will be held in Jackson in early December and the nominating committee will report their selections at that time. ★ ★ ★

T.P. 2891

DISCUSSION OF THIS AND ALL FOLLOWING TECHNICAL PAPERS IS INVITED

Discussion in writing (3 copies) may be sent to the Editor, *Journal of Petroleum Technology*, 601 Continental Building, Dallas 1, Texas, and will be considered for publication in the Transactions volume *Petroleum Development and Technology*. Discussion will close December 1, 1950. Any discussion offered thereafter should be in the form of a new paper.

THE EFFECT ON WELL PRODUCTIVITY OF FORMATION PENETRATION BEYOND PERFORATED CASING

JAMES M. McDOWELL AND **MORRIS MUSKAT**, MEMBER AIME, GULF OIL CORP., PITTSBURGH, PA.

ABSTRACT

A report is given of electrical analog experiments on the effect of casing perforation completions on well productivity for ideal uniform reservoirs under steady state homogeneous fluid flow conditions. Graphical results are presented for the effect of perforations of different densities and various degrees of penetration into the formation surrounding the casing or cement sheath. The latter range from perforations which terminate flush with the casing to those which extend into the formation a distance equal to the casing diameter. For the special case where the perforations terminate immediately beyond the casing with semi-spherical protrusions the electrical analog results correct and supersede previously reported theoretical calculations. It is found that the penetration of the perforations into the surrounding productive section may so increase the resultant productivity as to approach or even exceed that for open hole completions.

INTRODUCTION

A theoretical analysis of the effect of casing perforation on well completion, without additional penetration of the formation, was reported several years ago.[1] In this treatment the perforations were represented by mathematical sinks and no explicit account was taken of the imperviousness to flow of the casing in which the perforations were made. This procedure was justified by consideration of the mutual interference between the sinks, which seemed to indicate that the analytical method automatically eliminated flow across the casing radius between the perforations. However, both further theoretical investigation and the electrical analog measurements described below showed that this assumption in the previously developed theory was not valid and that the calculated well capacities would considerably exceed the correct values.§

Even if this simplifying assumption were retained the generalization of the theory to situations where the perforations extend into the producing formation would be extremely difficult. On the other hand, the electrolytic model analog of this type of steady-state homogenous fluid system is, in principle, so simple that it has not been worthwhile to attempt to develop the exact analysis even for the more limited case of strict casing perforation. The whole problem has therefore been studied anew by electrical models to cover the range from holes in the casing which terminate flush with the casing surface to such as extend into the surrounding rock to a depth equal to the casing diameter.

It is to be expected that the productivity of a well completed with casing radius* r_w, perforated with holes of radius r_p, and extending to depths d into the surrounding rock, would depend primarily on the dimensionless geometrical parameters of the system, such as $\frac{r_w}{r_w}$, $\frac{r_w}{a}$, $\frac{r_p}{a}$, and $\frac{d}{r_w}$, where r_e is the external boundary radius and a is the mean vertical separation between the perforations. It will also depend, of course, on the number of perforation lines or total perforation density. While such parameters automatically control analytical treatments, it would require a very extensive series of model experiments to fully disclose their functional effect on the well productivity. For practical purposes, however, a rather limited range of the variables suffices to give the effects of interest. Accordingly, in the experimental study reported here the casing diameter has been kept fixed† at six in., the perforation diameter has been taken as either one-fourth in. or one-half in., their density has been varied from one to eight per ft, and their penetration into the formation has ranged from zero to six in., with a primary scaling factor of one to six.

EXPERIMENTAL METHOD AND RESEARCH

Although electrolytic model experiments have been made for years, there still seems to be some question as to what set of conditions will give the best results. For this reason a number of electrode materials and electrolytes were tried. Those chosen for the final experiments were copper electrodes and a weak copper sulphate solution as the electrolyte. This

[1]Reference given at end of paper.

Manuscript received in the office of the Petroleum Branch January 12, 1950.

§Similar results with respect to perforations which do not penetrate into the formation have been recently reported by R. A. Howard and M. S. Watson, Jr., *Jnl. Petr. Tech.* (1950), 2, 179-82.

*Assuming that the casing has been cemented with a uniform and impermeable cement sheath, the effective casing radius is to be interpreted as the external radius of the cement annulus. It is also assumed here that the casing is set through the complete producing section, that it is perforated throughout with a uniform density and that the formation has a constant and isotropic permeability.

†As noted later, however, a uniform scale change permits reinterpreting the primary measurements to correspond to a casing diameter of 12 in.

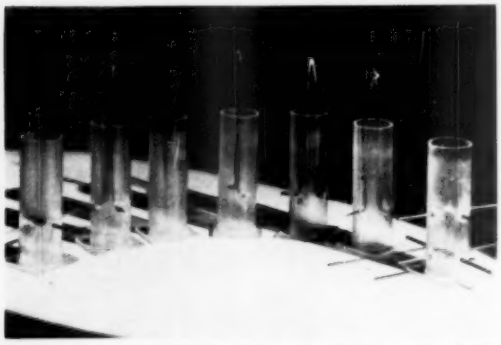

FIG. 1 — A PHOTOGRAPH OF SEVERAL MODEL WELL SYSTEMS FOR PERFORATED CASING COMPLETIONS.

combination gave electrical stability and satisfactory accuracy, as established by a number of experimental checks with theoretical calculations for simplified systems.

The model consisted of a cylindrical tank four feet in diameter with a plywood bottom coated with paraffin, and a stainless steel wall lined with thin copper foil about six in. high. This tank was filled with a weak $CuSO_4$ solution to a depth of two in. (one lb of $CuSO_4$ in 15.6 gal of distilled water). The open well was represented by a one in. dia. copper rod placed at the center of the tank. The well casings were represented by one in. OD polystyrene tubing closed at one end. The perforations were represented by copper wire electrodes extending through the tubing. The copper wire and foil were cleaned with nearly concentrated nitric acid just prior to making the measurements. A General Radio Bridge type 650-A was used in making the resistance measurements, with an external 1,000 cycle signal source.

The well models representing the well, where only the casing is perforated and no hole is made in the formation, had the ends of the wire electrodes smoothed off flush with the polystyrene tubing. Models were made with 1, 2, 4, and 8 electrodes representing a corresponding number of perforations per ft. A ratio of one to six related the model to the actual reservoir units, so that the two in. depth represents one ft. Various perforation patterns were used, but the results indicated that no detectable variation in productivity was apparent whether the perforations were all on one vertical line of the casing or evenly distributed around it. In each case, however, vertical symmetry was maintained so that the measurement would correspond to a horizontal layer of the reservoir one ft thick, representing a unit of symmetry in the composite system of arbitrary thickness. Perforations of one-half in. dia were represented by No. 12 A.W.G. copper wires (0.081 in. dia) and one-fourth in. dia. perforations were represented by No. 18 A.W.G. copper wire (0.040 in. dia).

To represent wells in which the perforating bullet or charge produced a hole in the formation extending beyond the casing and cement sheath models were made in which the wire electrodes protruded horizontally out from the tubing a corresponding distance. Models were made with semi-spherical protrusions only, and others with the wires extending one-fourth in., one-half in., and one in., which correspond to ratios of one-fourth, one-half and one with the casing diameter. A photograph of several of these model well systems is reproduced in Fig. 1.

It was assumed* that the flow would be essentially radial in the reservoir at a distance from the well corresponding to the radius of the tank. This distance was equivalent to 12 ft. It is necessary then to add to the resistance measured for each model the value of the calculated resistance for the area beyond the tank extending to the radius of drainage, which was chosen as 660 ft, as used in the previous theoretical calculations. The ratio of the productivities for any perforation pattern to that of the uncased well will be equal to the inverse ratio of their total resistance measured or calculated to the radius of drainage.

If R_m equals the measured resistance in the tank of radius r_m, R_t equals the total resistance to the radius of drainage r_e expressed in units of the model, and R_e equals the resistance between the radius of the tank and the radius of drainage, then:

$$R_t = R_m + R_e \quad \ldots \quad (1)$$

$$R_e = \frac{\rho \log r_e / r_m}{2\pi h} \quad \ldots \quad (2)$$

where ρ is the resistivity of the electrolyte and h is its thickness.

For the open or uncased well,

$$R_t = \frac{\rho \log r_e / r_w}{2\pi h} \quad \ldots \quad (3)$$

and:

$$R_m = \frac{\rho \log r_m / r_w}{2\pi h} \quad \ldots \quad (4)$$

Using the measured value of resistance of the tank, with the one in. dia copper electrode, of 41.5 ohms, the value of ρ as calculated from Equation (4) = 342.2 ohm-cm. From Equation (3) we find $R_t = 84.4$ ohms, and from Equation (2), $R_e = 42.95$ ohms. The ratio of the productivities of a cased well with a given pattern of perforations and the open well is therefore given by:

$$Q/Q_o = \frac{R_t \text{ (open well)}}{R_m + R_e} = \frac{84.4}{R_m + 42.95} \quad \ldots \quad (5)$$

The ratios thus calculated are plotted in Fig. 2 for one-half in. dia perforations and six in. dia casing, and in Fig. 3 for one-fourth in. dia perforations and six in. dia casing. By

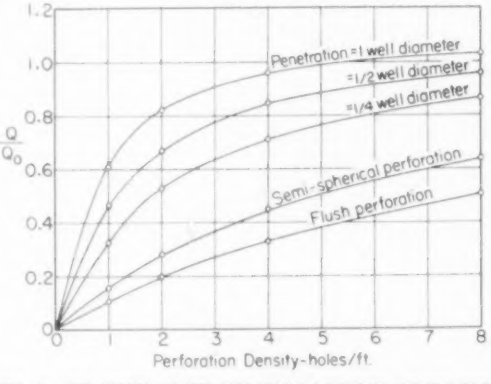

FIG. 2 — THE EFFECT OF THE PERFORATION DENSITY ON THE PRODUCTIVITY OF PERFORATED CASING COMPLETIONS, WITH VARIOUS PERFORATION PENETRATIONS INTO THE PRODUCING FORMATION. Q/Q_o = (PRODUCTIVE CAPACITY OF CASED AND PERFORATED WELL)/(PRODUCTIVE CAPACITY OF UNCASED WELL). CASING DIAMETER = SIX IN., PERFORATION DIAMETER = ONE-HALF IN.

*While probes of the actual potential distributions in the models showed slight variations near the external boundaries, these were considered to be of negligible importance.

changing the ratio between the model and the reservoir distances to one-twelfth instead of one-sixth and recalculating R_e, R_d and the ratios Q/Q_∞ the curves of Fig. 4 were obtained for one-half in. dia perforations and 12 in. dia casing.* Since this scale transformation must also be applied to the perforation density, the original data of Fig. 3 apply only to perforation densities as high as four per ft. The recalculated curves have therefore been extrapolated for the higher perforation densities, as indicated by the dash segments in Fig. 4.

Replotting the data of Figs. 2 and 3 for fixed perforation densities while varying the formation penetration the curves of Fig. 5 are obtained. Here the depth of the perforation has been expressed in units of the casing or cement sheath diameter to provide a dimensionless measure of this parameter. Along the ordinate axes are plotted the relative productivities for the perforations terminating flush with the casing or formation surface. For plotting purposes the data for the semi-spherical protrusions were arbitrarily assumed to have "penetrations" equal to the perforation diameter divided by the casing diameter.

To show the relative effect of the casing diameter on the well productivities, the basic data have been further replotted in Fig. 6. The solid curves are for a six in. dia casing (well bore) and are the same as the solid curves of Fig. 5. The dashed curves are for a 12 in. dia casing, but all other parameters are the same. It will be noted that, except for nearly zero penetration, the relative productivity for the same relative penetration increases with the casing diameter, but this is largely the result of the penetration into the formation being greater in actual depth. Where the perforations merely penetrate the casing and cement, the relative productivity Q/Q_∞ is slightly less for the larger diameters. The reason is that

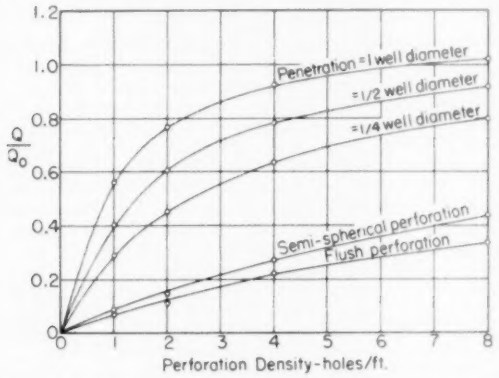

FIG. 3 — THE EFFECT OF THE PERFORATION DENSITY ON THE PRODUCTIVITY OF PERFORATED CASING COMPLETIONS, WITH VARIOUS PERFORATION PENETRATIONS INTO THE PRODUCING FORMATION. Q/Q_∞ = (PRODUCTIVE CAPACITY OF CASED AND PERFORATED WELL)/(PRODUCTIVE CAPACITY OF UNCASED WELL). CASING DIAMETER = SIX IN.; PERFORATION DIAMETER = ONE-FOURTH IN.

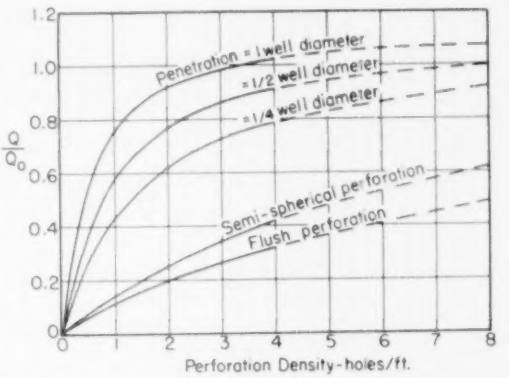

FIG. 4 — THE EFFECT OF THE PERFORATION DENSITY ON THE PRODUCTIVITY OF PERFORATED CASING COMPLETIONS, WITH VARIOUS PERFORATION PENETRATIONS INTO THE PRODUCING FORMATION. Q/Q_∞ = (PRODUCTIVE CAPACITY OF CASED AND PERFORATED WELL)/(PRODUCTIVE CAPACITY OF UNCASED WELL). CASING DIAMETER = 12 IN.; PERFORATION DIAMETER = ONE-HALF IN. DASHED SEGMENTS ARE EXTRAPOLATIONS.

whereas the area of the perforation holes through which the fluid can enter the casing is the same in both cases, the area through which the fluid would enter the uncased well increases with increasing diameter. This results in a larger open hole productivity Q_∞ for the larger size well, but a smaller value for the ratio, Q/Q_∞. For the same reason, the relative productivities for fixed absolute depths of penetrations will be somewhat smaller for the larger casing diameters.

DISCUSSION

Perhaps the most significant implication of the results plotted in Fig. 2-4 is the marked increase in relative well productivity resulting from even limited degrees of extension of the perforation holes into the producing formation. An appreciable increase is indicated even for the simple extension of the flush perforations so as to have nothing more than semi-spherical protrusions.* Moreover, as the formation penetration is increased, the resultant productivity, for densities of four per ft or greater, approaches and may even exceed that for the open hole completion. However, as is to be expected, the added gains from increased penetration continually decline, so as to give an asymptotic character to the curves of relative productivity vs. penetration as indicated in Fig. 5. It will be noted also from Fig. 5 that whereas the well productivity is quite sensitive to the perforation radius at zero or low penetration depths, at high values of the latter the perforation radius, if uniform, becomes of little importance.

To check on the effect of the assumption that the holes penetrating the formation beyond the steel casing are strictly uniform, several additional experiments were performed using uniformly tapered perforation electrodes of one-half in. equivalent diameter at the casing. It was found that for a perforation density of one per ft, the tapering would reduce the relative productivity by 9.1 and 12.2 per cent for penetrations of 25 per cent and 100 per cent of the casing diameter respectively. The corresponding reductions for a perforation density of four per ft were 4.7 and 9.0 per cent respectively. For still

*This conversion can also be made by applying the rigorous equation:

$$(Q/Q_\infty)' = \frac{\left(1 - \frac{\log c}{\log r_c/r_w}\right) Q/Q_\infty}{1 - Q/Q_\infty \left(\frac{\log c}{\log r_c/r_w}\right)} \quad \ldots \quad (6)$$

where Q/Q_∞ is the relative productivity for a known case corresponding to a drainage radius r_e, well radius r_w, perforation radius r_p, perforation penetration d, and n perforations per ft; and $(Q/Q_\infty)'$ is the relative productivity for r_e, $c\,r_w$, $c\,r_p$, cd, and n/c, where c is the common scaling factor.

*The previously mentioned theoretical treatment, which referred to such perforations, gave relative productivities exceeding those indicated in Figs. 2-4 by 25-70 per cent, depending on the perforation density.

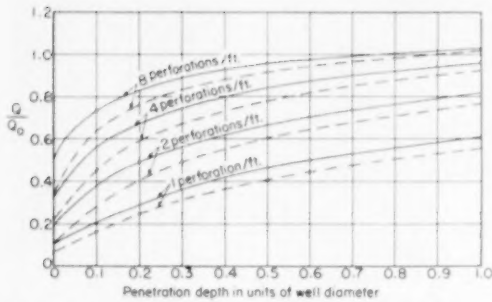

FIG. 5 — THE EFFECT OF THE DEPTH OF PERFORATION PENETRATION INTO THE FORMATION SURROUNDING THE CASING ON THE WELL PRODUCTIVITY FOR VARIOUS PERFORATION DENSITIES. Q/Q_o = (PRODUCTIVE CAPACITY OF CASED AND PERFORATED WELL)/(PRODUCTIVE CAPACITY OF UNCASED WELL). CASING DIAMETER = SIX IN.; ——— PERFORATION DIAMETER = ONE-HALF IN.; — — — — PERFORATION DIAMETER = ONE-FOURTH IN.

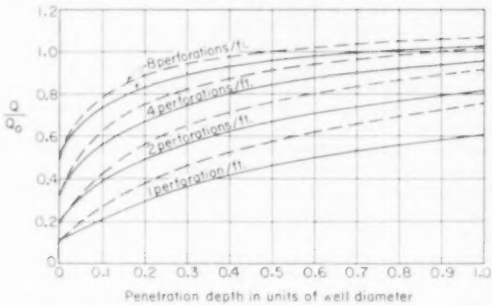

FIG. 6 — THE EFFECT OF THE DEPTH OF PERFORATION PENETRATION INTO THE FORMATION SURROUNDING THE CASING ON THE WELL PRODUCTIVITY FOR VARIOUS PERFORATION DENSITIES. Q/Q_o = (PRODUCTIVE CAPACITY OF CASED AND PERFORATED WELL)/(PRODUCTIVE CAPACITY OF UNCASED WELL). ——— CASING DIAMETER = SIX IN.; . . . . . CASING DIAMETER = 12 IN.; PERFORATION DIAMETER = ONE HALF IN. FOR ALL CURVES.

higher perforation densities the effects of the hole tapering would be even lower. While other variations in the geometry of the extended perforations could be visualized, these specific results indicate that for practical purposes the uniform perforation charts of Figs. 2-4 should suffice to give at least a semi-quantitative relative evaluation of the various perforation programs which might be considered for actual well completions.

The results presented here are essentially empirical, and do not reveal the full scope of the dependence of the well productivity on the basic dimensionless parameters of the producing systems. From a practical standpoint, however, the ranges of variables covered in the experiments span the conditions corresponding to actual well systems in which the perforations are uniformly distributed over the whole producing formation. With respect to the absolute magnitudes of the well productivities, it is to be noted that if the perforations just penetrate the casing or cement sheaths the need for relatively high perforation density is even greater than had been previously indicated by the theoretical calculations. However, if the perforations can be extended for appreciable distances into the producing formation productive capacities approaching those for uncased holes should be obtained even for moderate perforation densities. On the other hand, it is to be emphasized that the gains indicated by Figs. 2-5, either by increasing the perforation density or penetration, are to be expected only if the cementing of the casing has provided a perfect seal. If channels have been left in the cement sheath even a single perforation opening into such channels will give high well capacities which may not be appreciably increased by additional perforation.

ACKNOWLEDGMENT

The authors are indebted to R. D. Wyckoff for helpful suggestions in choosing the optimum conditions for operating the electrical analogs, and to P. D. Foote, executive vice-president of the Gulf Research and Development Co., for permission to publish this paper.

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DISCUSSION

By Robert A. Houard, Department of Physics, University of Oklahoma, Norman, Okla.

It is indeed fortunate that this excellent paper appears at this time, as the data presented here complement those presented by Watson and myself. Our data cover the range of penetration from zero to slightly over one-third the casing diameter, while the data presented here have a gap between zero and a penetration of one-fourth casing diameter, but go on to a penetration of one casing diameter. The authors also give data on one-half in. holes in six-in. casing, a case which is not covered in our paper.

It is gratifying to find that there is good agreement between the experimentally determined points in the two papers. The relative productivities obtained for six-in. casing with one-fourth in. perforations, however, show that the approximate scaling equation which we found to be valid for flush perforations, gives results which are somewhat high for deeper penetration. If one uses the scaling procedure of McDowell and Muskat (which is an exact, rather than approximate, scaling procedure, but which alters the vertical distribution of perforations) to convert our data for one-half in. perforations in 12-in. casing to one-fourth in. perforations in six-in. casings, the results agree well with those shown in Fig. 5 except in the region between zero penetration and a penetration of one-fourth casing diameter. In general, our data indicate that the interpolated sections of the curves in Fig. 5 do not rise quite steeply enough, or in other words, that the initial bit of penetration is even slightly more important than indicated by this figure. This may indicate that the arbitrary assignment of penetration equal to the perforation diameter for hemispherical perforations is not satisfactory. The extrapolated portions of Fig. 4 are confirmed by our results out to a perforation depth of one-third casing diameter.

Relative productivities greater than one which were predicted in our paper, have actually been found here for the greater depths of penetration. It is interesting to note that the differences between the results obtained by McDowell and Muskat and by ourselves vary by little more than the experimental error involved in the measurements in spite of the fact that they used round rather than flat-ended penetration electrodes such as we used, their electrodes were about 2.5 per cent undersized, and their eight electrode distribution is in two layers rather than a single horizontal layer. ★ ★ ★

T.P. 2953

THE KOBE POROSIMETER AND THE OILWELL RESEARCH POROSIMETER

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ABSTRACT

Reasons are given for using a Boyle's-law porosimeter in conducting core analysis for either routine or research purposes. Among other things, it is pointed out that such a porosimeter permits the measurement of all basic properties on the same sample, thereby eliminating the sources of error inherent in the use of adjacent samples. References are made to investigations of gas adsorption on various porous materials, to show that the use of helium in Boyle's-law porosimeters reduces to negligible proportions the error due to the adsorption or desorption of the operating gas.

Two Boyle's-law instruments are described, which permit accurate and rapid measurements of porosity. Schematic sketches and explanations are included, along with derivations of equations required in performing precise determinations.

Summaries of data obtained during calibration are tabulated and analyses of the data are presented as indications of the precision and accuracy of each device. Comparisons are also shown for measurements made with each of the instruments on the same test pieces and cores.

INTRODUCTION

An accurate porosimeter, operating on the principle of Boyle's law, is of considerable value in the analysis of cores for either routine or research purposes. This is due primarily to the fact that the measurement of porosity with such an instrument leaves the sample free of contamination by any liquid.

When used in conjunction with an extraction apparatus[1] for determining oil and water saturations, a Boyle's-law porosimeter permits the measurement of all basic properties on the same sample. This eliminates the sources of error inherent in the use of adjacent samples, or the necessity of determining porosity after all other properties have been obtained.

Large errors may result from combining measurements made on adjacent samples in order to obtain a single property. This type of error is definitely involved when oil and water are measured with one sample and the pore volume is measured with an adjacent one. Furthermore, the source of error would be present to some extent, even if the analyst could choose the samples so they were truly adjacent from a geological standpoint.

The use of adjacent samples in routine core analysis also necessarily decreases the probability of correlating core properties. For example, the chance of correlating the "irreducible" interstitial-water saturation with permeability, is bound to be greatly reduced by measuring these properties on "adjacent" samples.

For research purposes, amplification is scarcely required concerning the greater flexibility of a method for measuring porosity which leaves the core free of contamination by any liquid. Even under those circumstances which require that the core be saturated with a liquid, a previous measurement of porosity with a gas is useful in determining the degree of saturation that has been attained in the process.

Furthermore, for comparable accuracy, porosity usually may be determined more rapidly with a gas than with a liquid. This advantage of the Boyle's-law instrument is most outstanding when the determination time is compared with that required in obtaining porosity by evacuation of the core followed by saturation with a liquid of known density.

Several porosimeters which operate on the principle of Boyle's law have been described[2,3,4,5,6,7] in the literature. No comparison will be attempted between those instruments and the ones described herein.

Before helium gas became readily available, Boyle's-law porosimeters were subject to an appreciable error due to the adsorption of the operating gas on the surface of the core solids. There is considerable direct and indirect evidence in the literature to support the contention that the adsorption of helium on porous solids is negligible at room temperature.

In discussing the use of Boyle's-law porosimeters, Washburn and Bunting[2] stated that "for most ceramic bodies dry air is a satisfactory gas, but hydrogen will be required in some instances. Helium could, of course, be employed for all types of porous materials at room temperatures or above." Howard and Hulett[3] obtained evidence that the adsorption of helium was negligible at room temperatures, even on activated carbon; for the density measured with this gas was unaffected by changes in pressure or by changes in temperature from 25°C to 75°C. For oil-well cores, Taliaferro, Johnson, and Dewees[4] obtained lower porosities with helium than with air, but apparently did not study helium adsorption.

From the work of these investigators, it follows that the use of helium in Boyle's-law porosimeters reduces the error due to gas adsorption to negligible proportions. This makes it possible to construct instruments which permit the determination of porosity with (1) a high degree of accuracy, (2) with great rapidity, and (3) without contamination.

THE KOBE POROSIMETER

The fundamental design of the Kobe Porosimeter was developed by Kobe, Inc., which firm built about 12 of the instruments during 1936 and 1937. Since that time, seven or eight more have been constructed with their permission, making a total of about 20 that have been put into operation.

[1] References given at end of paper.

Manuscript received in the office of the Petroleum Branch, October 20, 1949.

In this porosimeter, the bulk volume is determined from the volume of mercury displaced by the sample, whereas the volume of sand grains and disconnected voids depends upon the volume of a gas displaced by the sample.

Although many modifications have been made in the design, method of calibration, and method of use, the manner of application of Boyle's law has remained the same. That is, in the relation $P_1V_1 = P_2V_2$, the initial pressure P_1 is fixed at that of the room, the initial volume V_1 is chosen, the final pressure P_2 is fixed at a definite higher value, and the final smaller volume V_2 is measured. However, volume differences instead of volumes are actually determined, as shown in the Appendix.

The Appendix contains a detailed description of the device, including the method of operation and accuracy of results. As indicated there, bulk volumes of steel balls of from 5 to 15 cc may be measured very rapidly, with errors which should not exceed 0.5 per cent. Sand-grain volumes in this range may be measured almost as rapidly, with errors which should not exceed 0.1 per cent. The above value for the accuracy of measuring bulk volume does not include the effect of any penetration of mercury into a core nor the effect of trapping air around a core, during a determination. With these limitations in mind and applying these figures to differences in porosity, a core with a bulk volume of 5.00 cc and a sand-grain volume of 4.00 cc should yield a value for porosity of 20.0 ± 0.5 per cent.

Various users of the Kobe Porosimeter have made modifications in the original design of the instrument. Several of these have been enumerated in the Appendix.

THE OILWELL RESEARCH POROSIMETER

Despite the many modifications that have been made in the design, method of calibration, and method of use of the Kobe Porosimeter, there were several reasons for developing a new instrument.

Chief among these was the amount of manual labor involved in making the necessary changes in the volume of the cell during a determination. For a large number of consecutive measurements the process becomes sufficiently tiring that one laboratory designed equipment for changing the volume mechanically. However, the device would have made the porosimeter considerably more complex, so the idea was abandoned without actual trial.

Another consideration involved the belief that a less expensive instrument might be developed, which would be quite useful for many production laboratories.

An analysis of the original Kobe Hydrogen Porosimeter described by Coberly and Stevens[2] indicated that modifications in this instrument, chiefly to increase accuracy, should yield an excellent porosimeter. During the time since construction of the Kobe Hydrogen Porosimeter, much more accurate gauges had been made available, and it was believed that the accuracy of the stock item might be increased still further. In addition, Coberly and Stevens had observed that decreasing the volumes of the chambers would increase accuracy.

The Oilwell Research Porosimeter was developed along these lines, using the principle of the original Kobe Hydrogen Porosimeter. That is, in the relation $P_1V_1 = P_2V_2$, the initial pressure P_1 is fixed at a definite value, the initial volume V_1 is fixed at that of the first chamber, the final lower pressure P_2 (or its equivalent) is measured on a bourdon-type gauge, and the final volume V_2 is the volume of the first chamber plus the volume of the second chamber diminished by the sand-grain volume. As explained in the Appendix, however, sand-grain volumes obtained with this instrument are not calculated with the use of Boyle's law.

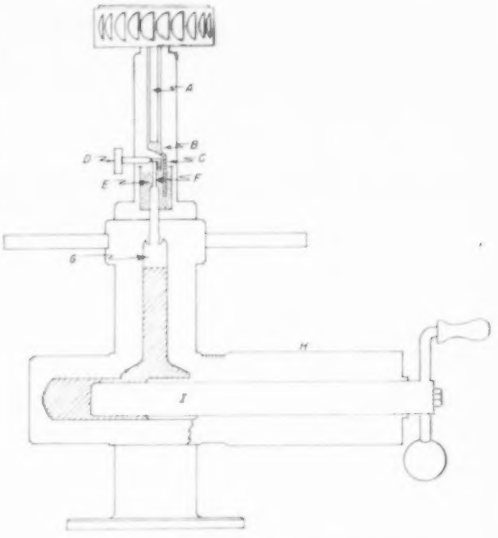

FIG. 1 — SCHEMATIC SKETCH OF KOBE POROSIMETER

The Appendix contains a detailed description of the instrument, including the method of operation and accuracy of results. As substantiated there by a statistical analysis of the calibration data, the design and method of operation permit very rapid measurements of sand-grain volumes from 4.0 cc to at least 13.5 cc, with errors which continually decrease in this range from ± 1.1 per cent to ± 0.2 per cent.

Transforming these limits to differences in porosity, a core with a sand-grain volume of 12.00 cc and a pore volume of 3.00 cc should yield a value for porosity of 20.0 ± 0.2 per cent, providing the sand-grain volume were measured in the instrument and the bulk volume were known exactly. Under the same conditions, a core with a sand-grain volume of 4.00 cc and a pore volume of 1.00 cc should yield a value for porosity of 20 ± 0.9 per cent. Single measurements should be within these limits 90 per cent of the time, and the limits could be still further reduced by using the average of several measurements.

ACKNOWLEDGMENTS

The men who have helped directly or indirectly in the preparation of this paper are too numerous to recount. However, the author wishes to express his gratitude to Kobe, Inc., for their generous cooperation, and to Oilwell Research, Inc., for release of the major portion of the data contained herein.

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APPENDIX

THE KOBE POROSIMETER

Description and Operation

A schematic sketch of one of the instruments is shown in Fig. 1. The dead-weight gauge *A* slides into a closely machined cylinder and rests on the surface of a quantity of oil confined in the chamber *B* just above the valve *D*. The oil in the chamber is connected by the tube *C* to the oil reservoir *E* in a plastic walled chamber. Pressure exerted on the surface of the reservoir is transmitted by the oil, through the tube, to the dead-weight gauge. The lower portion of the instrument contains mercury, the quantity of which is adjusted so that the micrometer barrel *H* reads approximately zero when the mercury level *G* is raised to the mark *F* in the tube centered in the plastic walled chamber. Turning the micrometer actuates the piston *I* inside the horizontal cylinder which raises or lowers the mercury level (shown at *G*) and the displacement volume is measured on the micrometer to 0.001 cc. The tube centered in the plastic walled chamber opens through the valve *D* to dried air at atmospheric pressure, and is also connected to the air space above the reservoir.

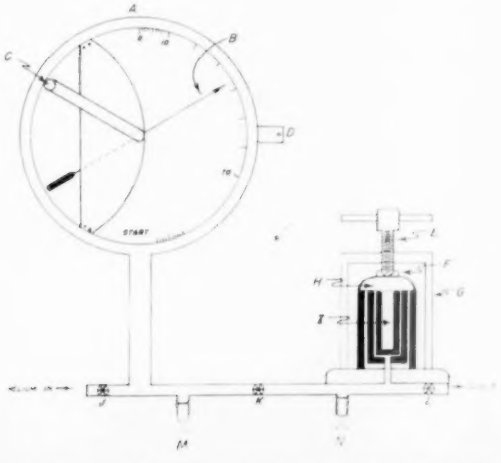

FIG. 2 — SCHEMATIC SKETCH OF OILWELL RESEARCH POROSIMETER

Table I — Determination of Constant from Operation of Kobe Porosimeter

R_s	R_s'	R	R_f'	K
85.000	20.027	50.000	11.095	1.343
70.000	16.210	50.000	11.095	1.341
50.000	11.095	40.000	8.546	1.342
50.000	11.095	20.000	3.438	1.342
30.000	5.989	20.000	3.438	1.343

For correct operation of the porosimeter, it is essential that the floating position of the gauge be accurately reproduced. This may be accomplished by projecting, on a screen, the image of a pointer mounted at the center of the gauge. The screen may be so situated that the movement of the gauge is magnified more than ten fold by the motion of the image. To insure free motion of the gauge at the floating position, it is rotated by a jet of air of constant direction and intensity.

Derivation of Equations for Determining Constant and Measuring Porosity

Considerable difficulty was experienced in obtaining reproducible values of the porosimeter constant by the method originally provided. Accordingly the author derived the relations given below and helped develop the following method of measuring porosity.

In determining the volume of sand grains (and disconnected voids) V_s, the gas is compressed from barometric pressure P_a to the floating pressure P_f by rotating the micrometer barrel from some chosen initial reading R to a reading R' at which the dead-weight gauge floats. The sample is then placed in the instrument and the process repeated by starting at the same initial reading and obtaining the final reading R_s'.

The total volume occupied by the gas when the micrometer reading is at R' may be represented by the symbol B. The application of Boyle's law to the above operations then yields the following relations:

$$P_a(B + R - R') = P_f B$$
$$P_a(B + R - R' - V_s) = P_f(B + R_s' - R' - V_s).$$

Elimination of B and R from these two equations gives,

$$V_s = \frac{P_f}{P_f - P_a} \cdot (R_s' - R').$$

The bulk volume is equivalent to the difference between the micrometer readings made at barometric pressure when the mercury has been forced up to the reference line, with and without the sample. Denoting the bulk volume by $R_s'' - R''$, the porosity becomes,

$$P = 1 - \frac{P_f}{P_f - P_a} \cdot \frac{(R_s' - R')}{(R_s'' - R'')}$$

This equation shows that, providing P_f is determined, the porosity may be computed from the barometric pressure and the micrometer readings.

Equating the forces which act in opposite directions on the floating dead-weight gauge yields the relation,

$$P_f A = P_a A + W \cos d,$$

where A represents the cross sectional area of the piston, W signifies the weight of the gauge and $\cos d$ corresponds to the cosine of the angle by which the piston deviates from the vertical. Since A, P_a, W and $\cos d$ can be determined with considerable accuracy, the expression permits the evaluation of P_f. For example, the measured values, $P_a = 14.64$ psi (75.67 cm of Hg at 32°F), $W = 4.794$ lbs, diameter of piston = 0.377 in., and the assumed value $\cos d = 1.000$, lead to $P_f = 57.64$ psi (3.924 atm., absolute) and $K = P_f/(P_f - P_a) = 1 - AP_a/W \cos d = 1.341$.

Table II — Data Obtained by Kobe Porosimeter with Test Pieces and Cores

Sample	R_s"	R"	R_s"-R"	R_s'	R'	R_s'-R'
$\frac{7}{8}$" ball	13.841	8.060	5.781	23.723	19.430	4.293
$\frac{13}{16}$" ball	15.166	8.063*	7.103	24.718	19.430*	5.288
$1\frac{1}{8}$" ball	20.349	8.065*	12.284	28.579	19.430*	9.149
$1\frac{1}{8}$" cylinder	20.131	8.068*	12.063	28.367	19.430*	8.937
$\frac{1}{4}$" core	17.603	8.070	9.533	25.442	19.430	6.012
1" core	19.866	8.073*	11.793	26.039	19.432*	6.607
1" alundum	21.434	8.077*	13.357	25.934	19.434*	6.500
$1\frac{1}{8}$" alundum	23.048	8.080*	14.968	28.288	19.436*	8.852
$\frac{7}{8}$" ball	13.855	8.080	5.775	23.740	19.435	4.305
$\frac{13}{16}$" ball	15.187	8.080*	7.107	24.734	19.433*	5.301
$1\frac{1}{8}$" ball	20.358	8.080*	12.278	28.584	19.432*	9.152
$1\frac{1}{8}$" cylinder	20.133	8.080*	12.053	28.369	19.431*	8.938
$\frac{1}{4}$" core	17.610	8.080	9.530	25.432	19.430	6.002
1" core	19.884	8.083*	11.801	26.042	19.432*	6.610
1" alundum	21.442	8.085*	13.357	25.929	19.435*	6.494
$1\frac{1}{8}$" alundum	23.046	8.088	14.958	28.280	19.437	8.843

*These values were interpolated from the measured ones.

Note: The constant was measured before and after the tests, by using values of R_1 and R_2 of 70,000 and 50,000. The values obtained for R_1' and R_2' were 19.418 and 14.383 before the tests, and 19.430 and 14.395 after the tests. Each of these sets of results yields a value of 1.3365 for the constant.

A second method of determining the porosimeter constant depends upon the operation of the instrument. With no sample present, the air is compressed from barometric pressure to the floating pressure by movement of the micrometer barrel from R_1 to R_1', and similarly, from a different initial reading R_2 to R_2'.

The constant was also computed from operations of the porosimeter at other values of the barometric pressure. At $P_b = 75.6$ cm of Hg at 32°F, the calculated values of K were 1.340, 1.340 and 1.339. At $P_b = 75.5$ cm of Hg at 32°F, the values were 1.338 and 1.338.

The last five values of the constant average 1.339 with an average barometric pressure of 75.56 cm of Hg at 32°F, while those of Table I average 1.342 with a barometric pressure of 75.9 cm of Hg at 32°F. These figures yield a grand average of $K = 1.340$ at $P_b = 75.7$ cm of Hg at 32°F. This agrees quite satisfactorily with the value of 1.341 calculated from the weight of the gauge and the diameter of the piston. Furthermore, the variation in the determined values of the constant, with barometric pressure, agrees with the expression derived above.

Accuracy of Kobe Porosimeter

To obtain an indication of the precision and accuracy of the Kobe Porosimeter, a pair of measurements was made on each of various test pieces and samples. Three steel ball bearings and one cylinder were included. Cylindrical cores were also used, two having been drilled from California oil sands and two from alundum. Helium was used as the operating gas.

The data have been recorded in Table II, with columns headed by the symbols defined in the section of Derivation of Equations for Determining Constant and Measuring Porosity. The figure given with each sample indicates the diameter of the sphere or cylinder.

Calculations made from the original data of Table II have been given in Tables III and IV. The bulk volume V_b is the volume of mercury displaced by the sample, whereas V_s is the volume of the solids and disconnected voids, as determined by Boyle's law. The differences, $\triangle V_b$, $\triangle V_s$, and $\triangle P$, between each pair of measurements of the bulk volume, the solid volume, and the calculated values of porosity serve to indicate the magnitude of variations in measurements made with the instrument.

The total volume occupied by the gas when the micrometer reading is at R_1' may be represented by the symbol C. The application of Boyle's law to the above operations then yields the following equations:

$$P_b(C + R_1 - R_1') = P_c(C + R_2' - R_1')$$
$$P_b(C + R_2 - R_2') = P_cC.$$

Elimination of C from these two relations gives,

$$P_c/P_b = (R_1 - R_2)/(R_2' - R_1'), \text{ or}$$

$$K = P_c/(P_c - P_b) = \frac{R_1 - R_2}{(R_1 - R_2) - (R_2' - R_1')}.$$

Determination of Porosimeter Constant

Determinations of K at various initial settings of one porosimeter, for $P_b = 75.9$ cm of Hg at 32°F, have been recorded in Table I.

The volumes of the steel balls were known to ±0.003 cc, from measurements made with a micrometer to ±0.0001 in. Accordingly, Table IV indicates the errors involved in measuring such test pieces with the instrument. It appears from the table that bulk-volume measurements were 0.5 per cent too high, while solid-volume measurements were within 0.1 per cent of the known values.

The above statement for the degree of accuracy of measuring bulk volume does not include the effect of any penetration of mercury into a core nor the effect of trapping air around a core, during a determination. With these limitations in mind and transforming the above figures to differences in porosity, a core with a bulk volume of 5.00 cc and a sand-grain volume of 4.00 cc would yield a value for porosity of 20.0 ± 0.5 per cent.

Modifications in Design of Kobe Porosimeter

Various users of the Kobe Porosimeter have made modifications in the original design of the instrument. These have been mainly to facilitate operation, as is apparent from the examples that follow.

Some users have replaced the dead-weight gauge by a Bourdon gauge. This change also facilitates counterbalancing the removable cap, which is the part above G in Fig. 1. Another user has moved the dead-weight gauge to the side of the

Table III — Deviations in Measurements with Kobe Porosimeter

	Bulk Volume		Solid Volume		Porosity		Differences		
	V_{b_1}	V_{b_2}	V_{s_1}	V_{s_2}	P_1	P_2	$\triangle V_b$,	$\triangle V_s$,	$\triangle P$,
Sample	cc	cc	cc	cc	%	%	cc	cc	%
$\frac{7}{8}$" ball	5.781	5.775	5.738	5.754	0.74	0.36	−0.006	+0.016	−0.38
$\frac{13}{16}$" ball	7.103	7.107	7.067	7.085	0.51	0.31	+0.004	+0.018	−0.20
$1\frac{1}{8}$" ball	12.284	12.278	12.228	12.232	0.46	0.37	−0.006	+0.004	−0.09
$1\frac{1}{8}$" cylinder	12.063	12.053	11.944	11.946	0.99	0.89	−0.010	+0.002	−0.10
$\frac{1}{4}$" core	9.533	9.530	8.035	8.022	15.71	15.82	−0.003	−0.013	+0.11
1" core	11.793	11.801	8.830	8.834	25.13	25.14	+0.003	+0.004	−0.01
1" alundum	13.357	13.357	8.687	8.679	34.96	35.02	±0.000	−0.008	+0.06
$1\frac{1}{8}$" alundum	14.968	14.958	11.831	11.819	20.96	20.99	−0.010	−0.012	+0.03

Table IV — Errors in Measurements of Ball Bearings with the Kobe Porosimeter

Dia. of Ball	Meas.* Vol., V_m,	Avg.‡ Bulk Vol., V_b,	Avg.‡ Solid Vol., V_s,	$V_s - V_m$		$V_s - V_m$	
in.	cc	cc	cc	cc	%	cc	%
$\frac{7}{8}$	5.750	5.778	5.746	+0.028	+0.49	−0.004	−0.07
$1\frac{1}{8}$	7.068	7.105	7.076	+0.037	+0.52	+0.008	+0.11
$1\frac{1}{8}$	12.224	12.281	12.230	+0.057	+0.47	+0.006	+0.05

*The measured volumes of the balls were computed from measurements made with a micrometer to ±0.0001 in.

‡The average bulk volume V_b and the average solid volume V_s were obtained by averaging the values given in Table III.

instrument, connection being made by a coil of tubing with small bore.

Portions of the threads on the cap and barrel have been removed, so the cap may be dropped in place and tightened with about a one-quarter turn. A zero adjuster has also been added by some, in the form of an adjustable reservoir of mercury attached to the main reservoir.

THE OILWELL RESEARCH POROSIMETER

Description and Operation

A schematic sketch of the Oilwell Research Porosimeter is shown in Fig. 2.

It consists of the 12-in. gauge *A* connected to the sample chamber *H* through the needle valve *K*. Similar valves *J* and *L* are also in the line to control the flow of a gas, such as helium, into the gauge and to exhaust the gas from the sample chamber. This is equivalent to two interconnected chambers, with the Bourdon tube of the gauge and the connecting lines being one, and the sample chamber and connecting lines being the other. Valves *M* and *N* have been added since the original calibration, to permit adjustment of the zero point by altering the amount of either valve stem included in the system.

In operation, helium is forced into the gauge chamber until the needle *B* on the dial attains the "start" position (100.00 psi), as seen through the illuminated eye piece *C* mounted on a swivel attached to the gauge. This reading of the gauge, as well as all others, is made while the attached buzzer *D* is in operation, to eliminate the effect of friction on the position of the needle. The gas is then expanded into the sample chamber and the position of the needle is noted. This reading, together with the calibration table, yields the volume of the sand grains and disconnected voids of the sample contained in the chamber.

The sample chamber may be opened or tightly sealed by means of the hinged yoke *G* and the hand screw *E*. These operations may be made very rapidly, as the thrust bearing *F* is so close to the top of the yoke that only three or four turns of the screw are required. In addition, the hinge of the yoke is automatically stopped at the proper position. Speed of operation is also increased by the presence of the removable sample holder *I*.

The seal at the cap of the sample chamber is obtained with an O-ring gasket, while metal-to-metal contact restricts any change in the volume of the sample chamber.

The gauge dial has 360 graduations equally spaced throughout a range which is equivalent to 48 to 82 psi, although the markings on the graduations bear no direct relation to pressure. The illuminated eye piece, with hairline, permits locating the position of the needle to the nearest half division, with no difficulty.

Calibration and Accuracy

The Oilwell Research Porosimeter was calibrated by means of chrome-alloy ball bearings that had been measured to 0.0001 in. with a micrometer. Combinations of the ball bearings were used so as to increase the total volume in increments of about 0.2 cc throughout the range from 1.072 to 10.970 cc. The range was similarly extended to 13.555 cc by using combinations of the ball bearings with two steel cylinders.

This method of calibration minimizes errors due to deviations of the gas from the perfect gas law, as well as errors due to uncertainties involved in assigning a definite value of pressure to each graduation on the dial and errors due to changes in the volume of the Bourdon tube. All that is required is to determine, with the desired accuracy, what sand volume is represented by each graduation on the dial, when the instrument is operated under the given conditions.

Readings made during calibration were corrected to a zero point of 8.40 by adding to the reading the difference between 8.40 and the measured or interpolated zero point. The zero point is the reading obtained when the helium gas is expanded into the empty chamber. This reading has been found to change gradually, during a series of measurements, from a value not less than 8.20 to a value not exceeding 8.95. Since obtaining the data given in the tables, the necessity of making the correction has been eliminated by installing zero adjusters in the system. It has also been found that the change in zero point may be decreased considerably, in a non-thermostated room, by removing the sample holder when the instrument is not in use.

The corrected readings were plotted against the ball volumes on a scale sufficiently large to produce a curve four feet in length. Curve readings were obtained by determining from this curve the reading which corresponded to the ball volume. The difference between the corrected reading and the curve reading gives an indication of the accuracy to be expected from the instrument. Unfortunately, space permits including only the following analysis of the calibration data.

The differences between the corrected reading and the curve reading conform very well to the normal curve of errors, and the standard deviation amounts to 0.073. Consequently, 90 per cent of all readings made with the instrument in a similar manner should lie within ±0.12 units of the true reading. This statistical analysis of the 90 single readings made during calibration is well supported by the pairs of readings of the same volumes, taken on different days. Not a single one of the 17 pairs of readings taken in this manner differs by more than 0.10 units.

It was apparent from the data that the errors in readings are relatively independent of the volume of the test piece. Accordingly, the percentage error increases with decreasing

Table V — Data Obtained by Oilwell Research Porosimeter with Test Pieces and Cores

Sample	Reading*	Solid Vol., V_s, cc	Reading*	Solid Vol., V_s, cc
$\frac{7}{8}$" ball	23.00	5.77	23.10	5.80
$1\frac{1}{8}$" ball	26.90	7.08	26.90	7.08
$1\frac{1}{8}$" ball	44.50	12.22	44.50	12.22
1" cylinder	43.50	11.97	43.60	12.00
$\frac{3}{4}$" core	30.10	8.12	30.10	8.12
1" core	32.60	8.90	32.60	8.90
1" alundum	31.80	8.65	31.80	8.65
$1\frac{1}{8}$" alundum	43.00	11.84	43.00	11.84

*The zero point was maintained at 8.40 by using the zero-point adjuster after each pair of determinations, as well as just before and just after the series of measurements was made.

volume. Multiplying the deviation of ± 0.12 by the rate of change in volume with respect to reading yields at 12.210 cc and 4.002 cc, for example, the respective differences of ± 0.030 cc or ± 0.25 per cent and ± 0.044 cc or ± 1.1 per cent.

Transforming these limits to differences in porosity, a core with a sand-grain volume of 12.00 cc and a pore volume of 3.00 cc should yield a value for porosity of 20.0 ± 0.2 per cent, providing the sand-grain volume were measured in the instrument and the bulk volume were known exactly. Under the same conditions a core with a sand-grain volume of 4.00 cc and a pore volume of 1.00 cc should yield a value for porosity of 20.0 ± 0.9 per cent. Single measurements should be within these limits of error 90 per cent of the time and the limits could be still further reduced by using the average of several measurements.

A test was made of the accuracy of the device by measuring the solid volumes of the same test pieces and cores that were used in obtaining a measure of the accuracy of the Kobe Porosimeter. Three steel ball bearings and one steel cylinder were included. Cylindrical cores were also used, two of California oil sands and two of alundum. The data have been compiled in Table V.

Table VI lists the deviations in measurements made with the Oilwell Research Bulkvolumeter and Porosimeter, while Table VII shows the errors made in determining the volumes of the ball bearings by means of these devices. The deviations and errors are in keeping with the analysis made of the accuracy of the porosimeter. Space does not permit a discussion of the bulkvolumeter.

The measurements of the cores with the Oilwell Research Porosimeter and Bulkvolumeter have been compared in Table VIII with those obtained with the Kobe Porosimeter. As seen there, the differences are within the limits of the experimental errors that have been given for each of the instruments. ★ ★

Table VI — Deviations in Measurements with Oilwell Research Bulkvolumeter and Porosimeter

	Bulk Volume V_b, cc		Solid Volume V_s, cc		Porosity P, %		Differences ΔV_b, cc	ΔV_s, cc	ΔP, %
Sample									
⅞" ball	5.728	5.797	5.77	5.80	−0.73	−0.05	+0.069	+0.03	+0.68
½" ball	7.120	7.051	7.08	7.08	0.56	−0.41	−0.069	±0.00	−0.97
1⅛" ball	12.232	12.180	12.22	12.22	0.10	−0.41	−0.052	±0.00	−0.51
1⅛" cylinder	11.938	11.964	11.97	12.00	−0.27	−0.30	+0.026	+0.03	−0.03
¾" core	9.492	9.497	8.12	8.12	14.45	14.50	+0.005	±0.00	+0.05
1" core	11.807	11.807	8.90	8.90	24.62	24.62	±0.000	±0.00	±0.00
1" alundum	13.318	13.292	8.65	8.65	35.05	34.92	−0.026	±0.00	−0.13
1⅛" alundum	14.833	14.907	11.84	11.84	20.18	20.57	+0.074	±0.00	+0.39

Table VII — Errors in Measurements of Ball Bearings with Oilwell Research Bulkvolumeter and Porosimeter

Diameter of Ball, in.	Meas.* Vol., V_m, cc	Avg.† Bulk Vol., $\overline{V_b}$, cc	Avg.† Solid Vol., $\overline{V_s}$, cc	$\overline{V_b}-V_m$, cc	$\overline{V_b}-V_m$, %	$\overline{V_s}-V_m$, %	$\overline{V_s}-V_m$, cc
⅞	5.750	5.762	5.785	+0.012	+0.21	+0.035	+0.61
½	7.068	7.086	7.08	+0.018	+0.25	+0.012	+0.17
1⅛	12.224	12.206	12.22	−0.018	−0.15	−0.004	−0.03

*The measured volumes of the balls were computed from measurements made with a micrometer to ±0.0001 in.
†The average bulk volume $\overline{V_b}$ and the average solid volume $\overline{V_s}$ were obtained by averaging the values given in Tables VI and V, respectively.

Table VIII — Comparison of Core Measurements Made by Kobe Porosimeter and by Oilwell Research Bulkvolumeter and Porosimeter

	Avg. Bulk Vol., V_b		Avg. Solid Vol., V_s		Avg. Porosity P				
Sample	Kobe, cc	O.R., cc	Kobe, cc	O.R., cc	Kobe, %	O.R., %	ΔV_b, cc	ΔV_s, cc	ΔP, %
¾" core	9.532	9.495	8.03	8.12	15.77	14.48	−0.037	+0.09	−1.29
1" core	11.797	11.807	8.83	8.90	25.14	24.62	+0.010	+0.07	−0.52
1" alundum	13.357	13.305	8.68	8.65	34.99	34.98	−0.052	−0.03	−0.01
1⅛" alundum	14.972	14.870	11.83	11.84	20.98	20.37	−0.102	+0.01	−0.61

PHASE EQUILIBRIA IN HYDROCARBON-WATER SYSTEMS

II – The Solubility of Ethane in Water at Pressures to 10,000 psi

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ABSTRACT

A preliminary investigation was made to determine the time required to attain equilibrium within the equilibrium cell for this system.

Experimental and smoothed data are presented for the solubility of ethane in water for temperatures of 100°, 160°, 220°, 280° and 340°F at pressures to 10,000 psia.

The minimum solubility phenomenon disappears at 10,000 psia within this temperature range.

INTRODUCTION

As a continuation of the investigation of the behavior of hydrocarbon-water systems, the experimental data on the solubility of ethane in water have been extended to 10,000 psia. The experimental apparatus, technique, materials, and analytical methods are essentially the same as previously reported.[1]

TIME-CONCENTRATION STUDY

Prior to the initial determinations of solubility in the ethane-water system, it was desired to establish the time

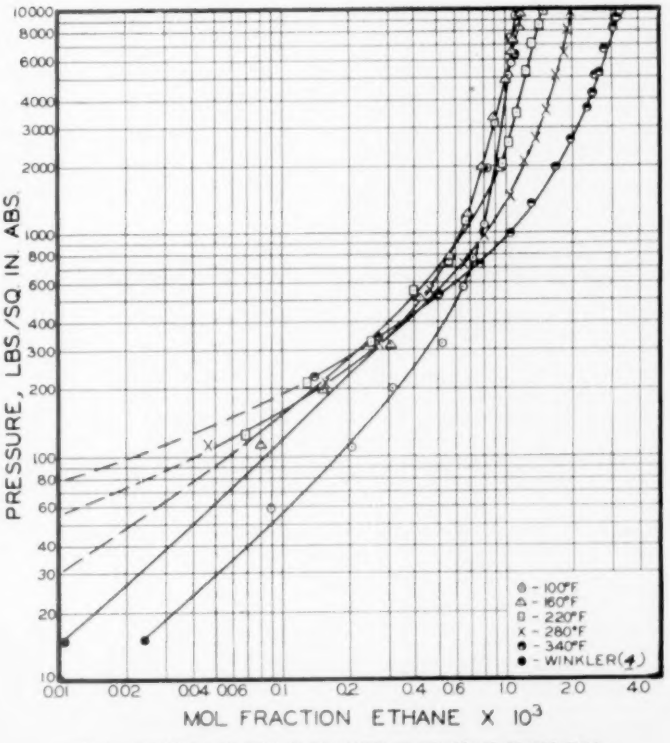

FIG. 1 — SOLUBILITY OF ETHANE IN WATER AT CONSTANT TEMPERATURE.

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[1]References given at end of paper.

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necessary to agitate the liquid and vapor at equilibrium temperature and pressure in order to have equilibrium between the phases. This was done by bringing the equilibrium cell to the equilibrium temperature, charging it with ethane to a pressure of 800 psia, and then charging with water to a pressure which was the same for each time-solubility determination. The temperature of the determinations was 100°F and the pressure, having been 6,330 psia for the first determination, was maintained at this same value on each subsequent determination. When the water was charged to the equilibrium cell, the cell temperature departed from 100°F and a period of time averaging about 40 minutes had to elapse before the cell came back to equilibrium temperature. During this time, the cell and its contents were not agitated. When the system had returned to equilibrium temperature, agitation was started and timing was begun. The results of the time-solubility determinations are given in Table I. Reading down a column in Table I, the figures represent respectively: the time of agitation for the particular run; the time at which water was charged to the cell, taken as zero; the time elapsing after charging the water and until the cell returned to equilibrium temperature where agitation was begun; the hours relative to zero time elapsing before agitation was stopped; and the solubility determined for the particular run. Since the ethane and water were in contact during the period when the temperature was returning to the equilibrium temperature, the time measured against the solubility values determined is not a true measure. Considerable diffusion undoubtedly occurred under the pressures involved; however, the technique used was necessary in view of the fact that for the shorter runs, the system may not have been at equilibrium temperature when the desired time had elapsed. From Table I it may be seen that equilibrium was attained within one hour after agitation was begun. Regardless of the indications toward a shorter agitation period, in subsequent determinations the system was agitated for three hours before a sample was taken.

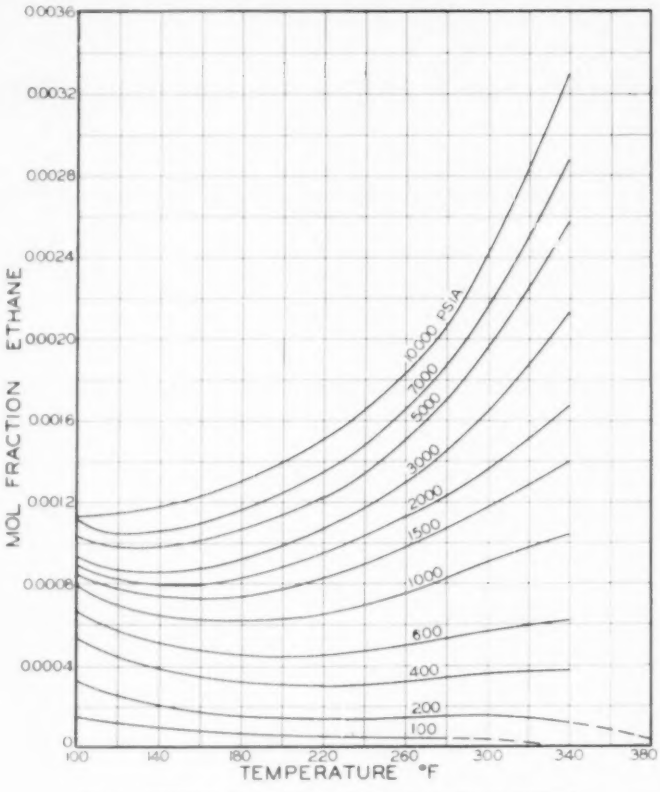

FIG. 2 — SOLUBILITY OF ETHANE IN WATER AT CONSTANT PRESSURE.

SOLUBILITY DATA

The solubility of ethane in water has been experimentally determined for temperatures of 100°, 160°, 220°, 280°, and 340°F at pressures extending to 10,000 psia. These data are shown in Table II and in Fig. 1 along with data previously reported.[1] The data for the entire range of pressures are cross-plotted in Fig. 2. From the curves in Figs. 1 and 2, the smoothed data are presented in Table III. It was necessary to adjust the smoothed values previously reported for the lower pressure range[1] in order to tie in the solubilities determined for the higher pressures.

The behavior of the ethane-water system in the vapor-liquid region as represented by Fig. 2 indicates a minimum solubility zone at pressures to about 9,000 psia. Although there is no maximum solubility indicated in Fig. 3 for pressures above 300 psia, it seems reasonable to expect a maximum in the isobaric curves at higher temperatures since the concentration of the solute is zero when the solvent is at its saturation temperature and pressure. For example, water has a vapor pressure of

Table I — Time-Concentration Determinations for Ethane in Water (100°F, 6330 psia)

Agitation Time, Hours	Elapsed Time, Hours ½	1	2	3	10
Water Charged	0.00	0.00	0.00	0.00	0.00
Agitation Begun	0.67	0.50	0.33	1.67	1.00
Agitation Stopped and Sample Taken	1.17	1.50	2.33	4.67	11.00
Solubility, *MF C.H.**	0.001047	0.001122	0.001100	0.001107	0.001102

*Concentration in mole fraction ethane.

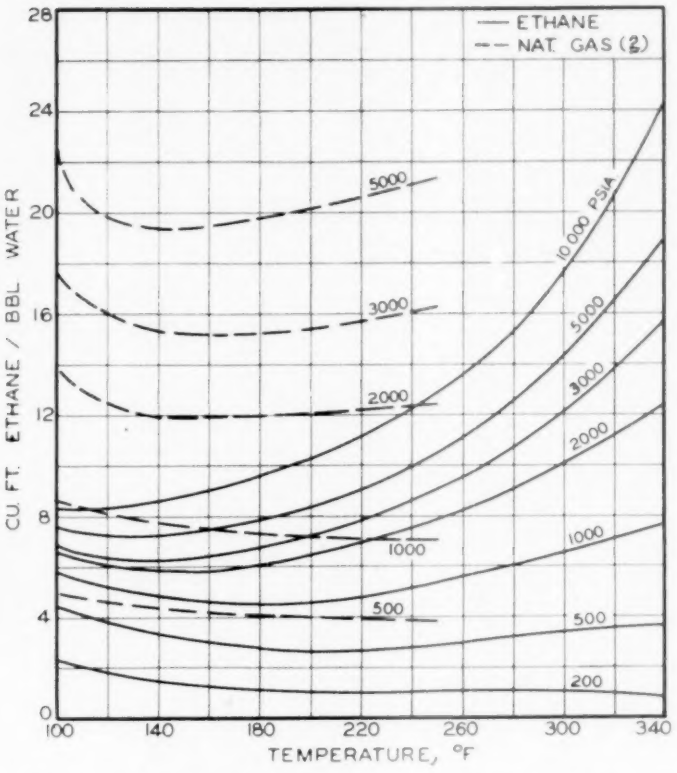

FIG. 3 — VOLUMETRIC SOLUBILITY OF ETHANE IN WATER REFERRED TO 60°F AND 14.7 PSIA

2,000 psia at a temperature of 635.82°F.[7] Therefore, although the 2,000 psia isobar of Fig. 2 indicates an increasing solubility with increasing temperatures, at some temperature this isobar must reach a maximum in order to approach zero at 635.82°F. The maximum concentrations at pressures below 300 psia are shown in Fig. 2 and have been discussed earlier.[1] From Fig. 2 one can see that the temperature at which minimum solubility occurs on an isobar decreases as the pressure for the isobar increases. Although the limited temperature range of this work prevents the appearance of maximum solubilities at pressures above 300 psia, one might expect that the temperatures for the maximum solubility would increase as the pressure for the isobar increases.

The solubility of ethane in water is given on a volumetric basis in Fig. 3 and is compared to the data of Dodson and Standing[2] for the solubility of natural gas in water. In Fig. 3 the solubility is given in cu ft of the vapor (at 60°F and 14.7 psia) per bbl of water at the same conditions. The natural gas used by Dodson and Standing contained 88.51 per cent methane and only 6.02 per cent ethane. The difference in the solubilities of ethane and natural gas in water indicates that the solubility characteristics of methane and ethane are vastly different. As may be seen from Fig. 3, at 5,000 psia the solubility of methane in water may be approximately two times the solubility of ethane in water.

Table II — Experimental Values for the Solubility of Ethane in Water

Pressure: Lb/Sq. In. Abs.

Solubility: Mol Fraction C_2H_6

100°F		160°F		220°F		280°F		340°F	
Pressure	*MF* C_2H_6	Pressure	*MF* C_2H_6	Pressure	*MF* C_2H_6	Pressure	*MF* C_2H_6	Pressure	*MF* C_2H_6
59	0.0000893	113	0.0000812	123	0.0000698	113	0.0000475	226	0.000140
110	0.0002040	196	0.0001540	212	0.0001300	210	0.0001580	334	0.000261
200	0.0003110	315	0.0003090	322	0.0002560	320	0.0002720	529	0.000503
340	0.000521	512	0.000417	548	0.000391	557	0.000464	737	0.000770
568	0.000647	785	0.000570	752	0.000560	736	0.000660	992	0.001039
767	0.000709	1215	0.000679	1120	0.000661	979	0.000803	1370	0.001311
1080	0.000801	1985	0.000788	1965	0.000944	1470	0.001065	1985	0.001671
1925	0.000821	3275	0.000895	2030	0.000964	2105	0.001208	2605	0.001970
3115	0.000890	4885	0.001011	2535	0.001042	2680	0.001384	3640	0.002325
5035	0.001018	6485	0.001078	3455	0.001132	3585	0.001530	4285	0.002480
5800	0.001066	7350	0.001100	5320	0.001249	5045	0.001703	5035	0.002515
6330	0.001105	8330	0.001178	7010	0.001329	6465	0.001867	5250	0.002635
7605	0.001060	9650	0.001166	8480	0.001434	8055	0.001901	6630	0.002790
9455	0.001130			9935	0.001514	9775	0.002005	8320	0.003060
								9335	0.003200
								9835	0.003300

ACKNOWLEDGMENT

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* * *

Table III — Smoothed Values for the Solubility of Ethane in Water
Mole Fraction C_2H_6 x 10^2

Pressure, psia	100°F	160°F	220°F	280°F	340°F
200	0.328	0.173	0.144	0.151	0.110
400	0.534	0.348	0.299	0.341	0.370
600	0.667	0.478	0.449	0.528	0.620
800	0.749	0.569	0.559	0.697	0.841
1000	0.793	0.628	0.647	0.825	1.039
1250	0.822	0.683	0.742	0.962	1.236
1500	0.849	0.729	0.823	1.071	1.395
2000	0.888	0.788	0.955	1.229	1.677
2500	0.915	0.831	1.020	1.341	1.920
3000	0.933	0.873	1.073	1.440	2.127
3500	0.959	0.913	1.121	1.518	2.291
4000	0.982	0.951	1.163	1.582	2.413
4500	1.009	0.986	1.192	1.640	2.498
5000	1.032	1.014	1.222	1.698	2.571
6000	1.080	1.060	1.287	1.791	2.721
7000	1.112	1.098	1.350	1.867	2.867
8000	1.126	1.142	1.412	1.930	3.011
9000	1.129	1.187	1.464	1.998	3.154
10000	1.133	1.228	1.500	2.063	3.290
14.7	0.0240*	0.0105*			

*Winkler.

RELATIVE PRODUCTIVITY OF PERFORATED CASING - II

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ABSTRACT

The effect of depth of formation penetration by casing perforations has been studied by means of an electrolytic model. It is found that the relative productivity of perforated casing is profoundly affected by the depth to which the formation is penetrated. The first in. of penetration is of especial importance. A scaling equation which was shown to agree with experimental results at zero penetration is used to calculate the relative productivity of a scaled down casing with scaled down perforations.

INTRODUCTION

In an earlier paper[1] the authors showed that the point sink representation of casing perforations is inadequate. It was pointed out at that time that while the electrolytic model results were a marked improvement over point-sink calculations, they still left a great deal to be desired in that the electrolytic model represented a case not realizable in practice, namely, a clean hole through the casing but undisturbed formation on the other side of the casing. Obviously, to be effective, the perforation must penetrate a finite distance into the producing formation. It was the purpose of the present investigation to find how the relative productivity of perforated casing varies with depth of penetration.

The term "depth of penetration" as used in this paper refers to the distance which the perforation penetrates the producing formation. The amount of casing and cement penetrated is not taken into account, a fact which is discussed more fully later. The "casing radius," therefore, is to be interpreted as the radius of the boundary between cement and formation wall, in cases where the casing is not in contact with the formation wall.

[1]Reference given at end of paper.

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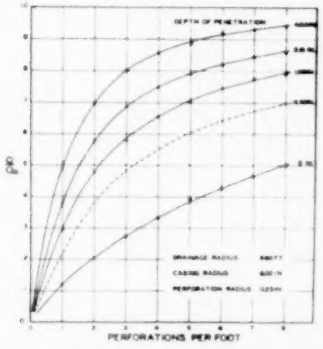

FIG. 1 — VARIATION IN RELATIVE PRODUCTIVITY WITH PERFORATION DENSITY FOR 12-IN. CASING WITH 0.5-IN. DIAMETER PERFORATIONS FOR VARIOUS PENETRATION DEPTHS.

APPARATUS

The electrolytic model experimental setup was identical with that described in the previous paper[1] except that the platinum electrodes were now allowed to project from the lucite cylinder by varying amounts. When fewer than eight electrodes were used, the unused ones were covered with a coat of insulating material to minimize disturbances to the current flow-lines. Comparison runs made with the unused electrodes uninsulated, however, showed that the values of Q/Q_s so obtained did not vary by more than the experimental error from the values obtained with the unused electrodes insulated.

RESULTS

The variation of relative productivity* with perforation density is shown for various penetration depths from 0 to 4.03 in. in Fig. 1. It will be seen that even one in. of penetration into the formation results in a huge increase in the relative productivity. Moreover, as the depth of penetration increases, it becomes less and less advantageous to use large perforation densities. 80 per cent of open hole productivity being obtained with only three 0.5-in. diameter holes per foot when the penetration is 4.03 in.

*Relative productivity is defined here as the ratio of the production through the perforations to the production through an uncased hole of the same radius as the "casing radius." This ratio does not correspond exactly to actual field conditions, for the comparison between rates of flow in the cased and uncased hole assumes the same pressure differential between the outer boundary and the well bore in each case. Since fluid friction will cause a pressure drop along the casing or tubing which is proportional to the rate of flow, the pressure at the formation face will not be quite the same in the two cases.

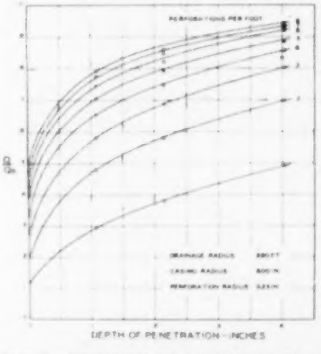

FIG. 2 — VARIATION IN RELATIVE PRODUCTIVITY WITH DEPTH OF PERFORATION PENETRATION FOR 12-IN. CASING WITH 0.5-IN. DIAMETER PERFORATIONS FOR VARIOUS PERFORATION DENSITIES.

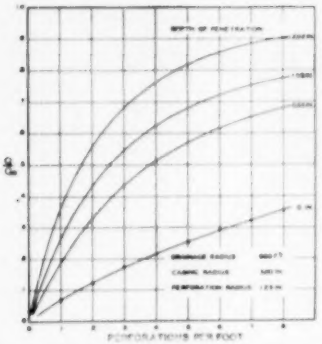

FIG. 3 – VARIATION IN RELATIVE PRODUCTIVITY WITH PERFORATION DENSITY FOR 6-IN. CASING WITH 0.25-IN. DIAMETER PERFORATIONS FOR VARIOUS PENETRATION DEPTHS.

Fig. 2 shows the variation of relative productivity with depth of perforation penetration for various perforation densities from 1 to 8 per ft. From these curves it is evident that the initial in. of penetration is, relatively, much more important than an additional in. of penetration.

The platinum electrodes used in this work had a conductivity about 2×10^7 times that of the electrolyte, so that they could be considered to be effectively perfect conductors, corresponding, therefore, to perforation holes offering no flow resistance. Under such circumstances one would expect, from theoretical considerations, that the productivity would increase without limit as the depth of penetration is increased. The flattening of the curves of Fig. 2 at the greatest depth of penetration is an indication that this expectation would be borne out by electrolytic model studies if the penetration depths were increased. Since the perforation hole does offer a small flow resistance, the productivity will, in actual practice, approach a limiting value as the depth of penetration is increased. It is altogether possible, however, that the productivity from perforated casing may exceed 100 per cent of open hole production even when the flow resistance of the perforation hole is taken into account. This will certainly be true in the case of formations of low permeability.

It has previously been shown that one may construct an approximate formula for computing the relative productivity of perforated casing when the dimensions of casing and perforation hole are each k times those for which the variation of relative productivity is known. The equation which was obtained was

$$\left(\frac{Q}{Q_o}\right)' = \frac{1}{1 - \dfrac{1}{1 + \dfrac{Q/Q_o}{k\left(1 - \dfrac{\ln k}{\ln r_e/r_w}\right)}}}$$

Where

$(Q/Q_o)'$ is the desired relative productivity.

Q/Q_o is the relative productivity which is known for certain casing and perforation radii

r_e is the drainage radius for the known case

and r_w is the casing radius for the known case. Fig. 3, which shows the variation in relative productivity with perforation density for various penetration depths for 6-in. casing with .25-in. diameter perforations, was obtained from calculations using the above formula and the experimental results shown in Fig. 1. Fig. 4, using the results of the calculations for Fig. 3, shows the variation in relative productivity of 6-in. casing with 0.25-in. diameter perforations with depth of penetration for various perforation densities.

CONCLUSIONS

Since the curves of Figs. 2 and 4 are very steep for small depths of penetration, it will be seen that, if the permeability of the formation very near the well bore is in any way markedly reduced during completion of the well, the effective depth of penetration will be reduced and the productivity appreciably lessened. Obviously any plugging of the shot holes which results in appreciable resistance to the flow of fluids through them will result in markedly decreased productivity. Finally, the reader is reminded that such electrolytic model studies as this represent the flow of a single, homogeneous, incompressible fluid through an isotropic permeable formation.

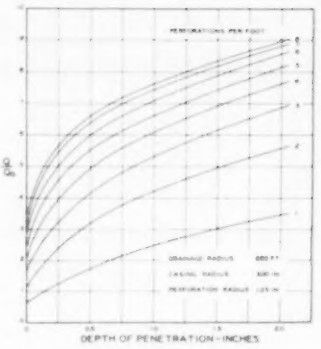

FIG. 4 – VARIATION IN RELATIVE PRODUCTIVITY WITH DEPTH OF PERFORATION PENETRATION FOR 6-IN. CASING WITH 0.25-IN. DIAMETER PERFORATIONS FOR VARIOUS PENETRATION DENSITIES.

ACKNOWLEDGMENT

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1. R. A. Howard and M. S. Watson: *Trans.* AIME, (1950), **189**, 179.

* * *

HIGH PRESSURE WATER INJECTION FOR MAINTAINING RESERVOIR PRESSURES, NEW HOPE FIELD, FRANKLIN COUNTY, TEXAS

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ABSTRACT

This paper presents a discussion of the pressure maintenance operations which were begun in the New Hope Field, Franklin County, Texas, in 1944. The project has required the injection of extraneous waters at depths from 7,300 to 8,000 ft with intake well-head pressures up to 4,000 psi in three different reservoirs — the Bacon, Hill, and Pittsburg.

Records of oil and water production, water injection and the GOR have been kept for each reservoir and reservoir pressures were taken at regular intervals. These data indicate that the Bacon Reservoir had no apparent water encroachment up to the time of water injection. However, the Pittsburg and Hill reservoirs had some natural water influx but not sufficient to prevent pressures from declining below the bubble point. The Bacon and Hill reservoirs responded almost immediately to water injection, while the Pittsburg, which is the least permeable, has shown good pressure response only since August, 1948.

The principle objective of the project has been to increase ultimate recovery. Success of the project to date also has resulted in reduced lifting costs. Estimates based on the initial water breakthrough patterns indicate that the primary objective of substantial additional recovery will be accomplished, and there is a possibility that the original estimates of oil recovery with pressure maintenance will be exceeded.

(References given at end of paper.
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INTRODUCTION

This pressure maintenance project was one of the earliest primary pressure maintenance programs to be attempted on a multiple zone field. There are three producing reservoirs into which water is being injected for the purpose of maintaining pressure and increasing the ultimate recovery from each. This paper is limited in scope to an account of the development of the project, the pressure production relationship prior to the injection of water and the effect of water injection on the producing reservoirs. Also discussed are the nature of the injection system and the indicated results on initial water break-through in the Bacon Reservoir.

FIELD CONDITIONS

The New Hope Field, which is located about 12 miles northeast of Winnsboro, Franklin County, Texas, is an elongated symmetrical anticline containing four known oil reservoirs. The reservoirs are of the Trinity group of the Comanchean or Lower Cretaceous period and are found in Table I.

The oil productive portion of each reservoir is not present in all of the producing wells because their areas and positions vary with respect to one another. Fig. 1 shows the relative position of the four reservoirs and illustrates how some wells could penetrate all four, while others are restricted to three, two, or perhaps one, depending on structural location. The first three reservoirs contain undersaturated oil. The deepest, the Elledge, has a primary gas cap. Although this reservoir covers a considerable area of the field, it has a very thin section and a low order of permeability. Elledge producing wells have generally been characterized by an early increase in GOR, making it necessary to recomplete them in other reservoirs. (At present, one well is completed in the Elledge, which is still producing.) Because of the difficulties encountered in producing oil from this reservoir, and the small quantity of oil actually present, future attempts at producing it will probably be on a salvage basis during the later life of the program. For this reason, the remainder of this report will be confined to a discussion of the Bacon, Hill and Pittsburg reservoirs.

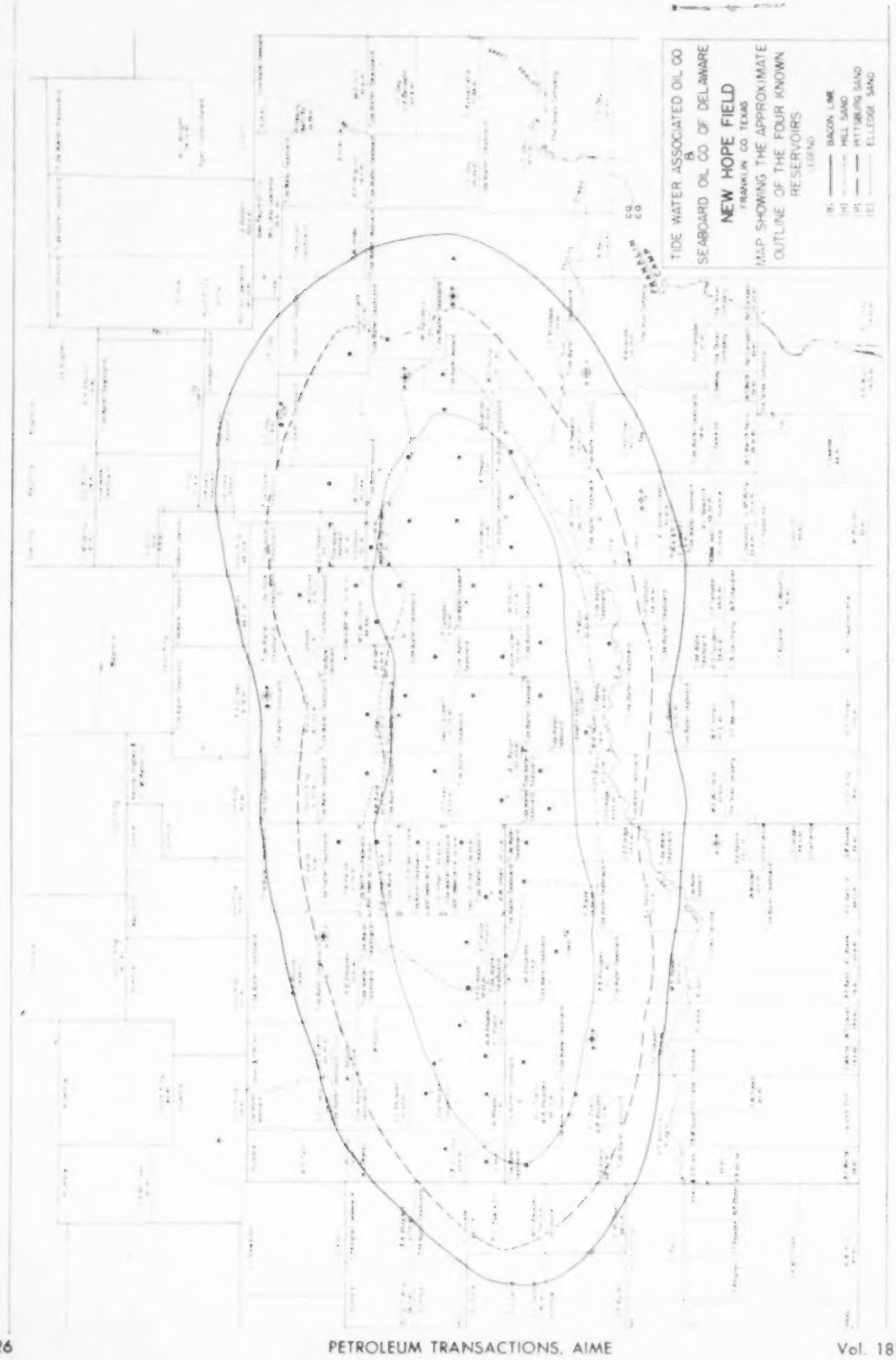

FIG. 1 — MAP SHOWING THE APPROXIMATE OUTLINE OF THE FOUR KNOWN RESERVOIRS, NEW HOPE FIELD.

Table I

Reservoir Name	Type Formation	Average Depth Ft	Estimated Productive Area—Acres
Bacon	Oolitic Limestone	7,300	4,609
Hill	Sandstone	7,400	1,284
Pittsburg	Sandstone	7,900	3,304
Elledge	Sandstone	8,200	2,890

The location of the reservoirs with respect to each other has been conducive to dual completions. Fifty-nine producing wells have been drilled in the field to date; not included in this figure are two non-commercial Bacon producing wells, and one dry hole, each of which was converted into a water injection well. Two wells which were drilled as injection wells are not included. Three of the 59 producing wells have been converted into water injection wells, making a total of 56 producing wells and nine dual water injection wells as of October, 1950. Most of these 56 have been dually completed at one time or another and at the present time there are still 11 dually completed producing oil wells, while eight of the nine injection wells are also used as dual water injection wells.

The data in Table II represent average values which have been obtained from an analysis of many samples of the producing formations, all of which were cored with water base drilling mud. Electric logs were made on all wells prior to setting casing, which in turn has furnished an additional means of checking the position and content of the various reservoirs. Representative bottom hole oil samples were obtained early in the life of each reservoir and these data have also provided a valuable basis for evaluating reservoir behavior. The estimated quantities of original oil in place in each of these reservoirs are based on the above factors, all of which have been well established on a statistical basis.

Using the oil in place value and the compressibility of the saturated oil (Items 8 X 15), the volume of stock tank oil production per pound drop was determined for each reservoir and is shown in Item 19. Item 19 represents the expected behavior of all of the stock tank oil in place between original and saturation pressure if no water drive is present. In this determination, errors are introduced by neglecting the change in formation volume factor and by assuming the compressibility factor to be constant over the entire pressure range. These errors are very small, however, in comparison with the substantial differences caused by water encroachment and will be considered negligible in comparing with actual reservoir performance.

PRODUCTION HISTORY

Pressure performance and production data have been recorded and are shown on a semi-annual basis in Tables III, IV, and V, and in graphical form on Figs. 3, 4, and 5. Available data on the Elledge Reservoir are incomplete and are not included in this report. As previously pointed out, the oil in the Bacon, Hill and Pittsburg reservoirs is considerably undersaturated in each case. Because of this, it was possible to determine the presence or lack of water influx in each reservoir, and to show definite need for water injection long before pressures approached the bubble point.

Bacon Lime Reservoir

Referring to Table III and Fig. 3, it can be seen that the rapid rate of pressure decline even with low average producing rates becomes evident at once. Reservoir pressure dropped 365 psi between May 1, 1943, and August 9, 1944, during which time the average producing rate was 436 B/D. During the following period, between August 9, 1944, and April 1, 1945, the reservoir lost 890 psi while averaging 1,229 B/D of oil. In each case, the reservoir

Table II—Characteristics of Reservoir and Contents

Item No.		Bacon Lime	Hill Sand	Pittsburg Sand	Elledge Sand
1	Zone				
2	Discovery Date	5-4-43	5-5-44	4-26-43	2-19-44
3	Well Spacing	440'-960'	440'-960'	440'-960'	440'-960'
4	Proration Unit, acres per well	40	40	40	40
5	Interstitial Water, % (1)	25.41	30.58	28.73	35.42
6	Porosity, % (1)	18.9	16.6	13.4	10.8
7	Permeability, md (1)	479	259	61.1	17.2
8	Original Reservoir Pressure, Po, psig	3,425	3,425	3,523	3,741
9	Saturation Pressure, Ps, psig	905	1,110	1,682	3,741 (2)
10	Formation Volume Factor at Ps	1.223	1.287	1.456	1.952 (2)
11	Reservoir Temperature, Tr, F°	203	208	216	217
12	Reservoir Oil Viscosity at Ps and Tr, cent	0.71	0.73	0.38	
13	Stock Tank Oil Gravity, °API	43	45	49	52
14	Solution Gas/Oil Ratio, cu ft/bbl	256	286	577	1,475
15	Avg. compressibility of saturated oil between Po and Ps at Tr, bbl per million bbl per psi change in pressure	12.00	13.26	15.30	
16	Est. avg. net pay thickness, ft	10.93	13.55	17.30	3.62
17	Est. avg. initial productivity index, bbl/day/psi	1.2	2.4	0.67	
18	Est. volume of original stock tank oil in place, Millions of bbl	44.89	12.84	29.92	2.74
19	Est. stock tank oil recovery between Po and Ps if no water drive present, bbl./psi. (3)	508	176	458	

(1) Weighted average from core analysis data.
(2) Elledge reservoir contains a primary gas cap. Original conditions estimated from available data.
(3) Barrels of stock tank oil per pound per square inch drop in pressure.

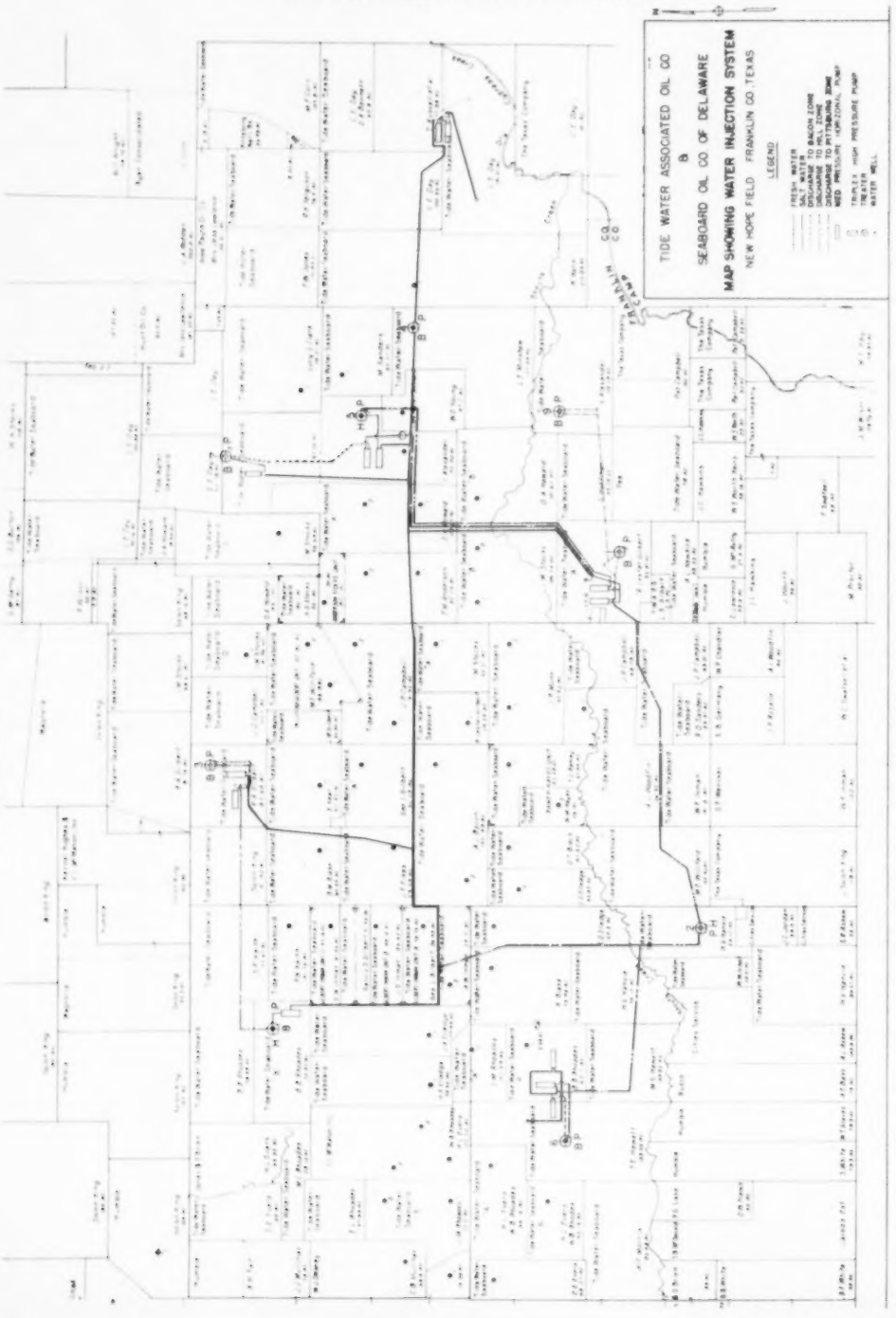

FIG. 2 — MAP SHOWING WATER INJECTION SYSTEM, NEW HOPE FIELD

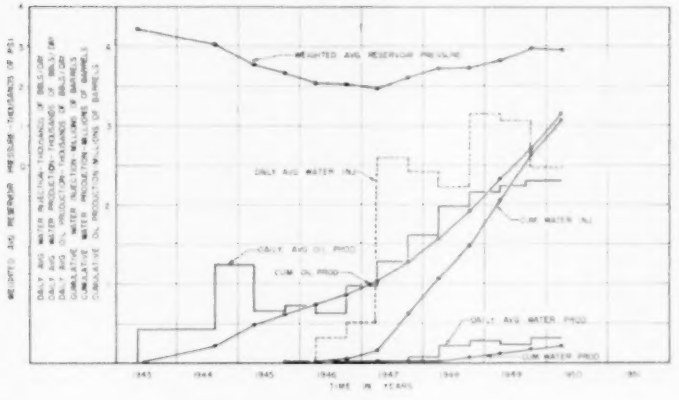

FIG. 3 — PRESSURE AND PRODUCTION STATISTICS FOR THE BACON LIME RESERVOIR

was producing about 550 bbl of stock tank oil per lb drop. This rate of recovery is remarkably close to the value of 538 bbl psid referred to in Item 19, Table II. The fact that these, and subsequent surveys, showed little change in the rate of recovery was considered a definite sign of little or no natural water influx. This conclusion was necessary even though the average reservoir permeability indicated that at least a partial water drive should develop if such permeability continued out into the surrounding aquifer. It should be noted that the low production pressure drop relationship was consistent until the time water injection began, but that the response to water injection was immediate even though the pressure continued to decline for one year after injection began. During the period October 1, 1946, to April 1, 1947, the production/pressure relationship increased from 570 to 3,076 bbl/psid, or from 555 to 624 bbl/psid on a cumulative basis. Subsequently, as additional injection facilities were installed, the downward pressure trend was reversed and has been increased from the low point of 1,936 psig on April 1, 1947, to 2,913 psig as of April 1, 1950.

The behavior of the producing wells was consistent with the pressure history. As the pressure declined, more and more Bacon wells ceased flowing. As the most shallow reservoir, the Bacon had been used for annulus production in the dual completion program. The Hill producing wells have always flowed but the Pittsburg Reservoir, as will be shown later, was concurrently producing with a high rate of pressure decline. The net effect was that only the Hill wells were available for dual completion and this in turn resulted in greatly curtailed production from the Bacon and Pittsburg. In addition to this, it was obvious that an attempt to produce at high withdrawal rates would surely result in reservoir pressures declining below saturation pressure. The producing rates, therefore, declined to an average of 639 B/D for the Bacon prior to the time definite signs of improvement were shown. With the favorable response to water injection, and the subsequent return of reservoir pressures to higher values, more and more Bacon wells began to flow. All water free Bacon wells are flowing and average reservoir withdrawal rates are at an all-time high of 2,316 B/D.

Hill Sand Reservoir

Table II shows that the permeability of the Hill sand reservoir averages 390 md. This reservoir also has the most favorable distribution of permeability of all the zones. In referring to Table IV and Fig. 4, a contrast between Bacon and Hill reservoir performance is immediately evident. The expected rate

Table III — Pressure and Production Statistics for the Bacon Oolitic Lime Reservoir, New Hope Field

Date	Wtd. Avg. Reservoir Pressure psig	Pressure Change: Per Interval psi	Pressure Change: Cumulative psi	Cum. Stock Tank Oil Prod. Bbl	Cumulative Wtr. Prod. Bbl	Cumulative Water Inj. Bbl	Time Interval Days	Interval Rate of Prod. or Injection, B/D: Oil Prod.	Wtr. Prod.	Wtr. Inj.	Oil Recovery Stock-Tank Bbl/psi Drop: Per Inter.	Cumulative
5-1-43	3,425			0								
5-9-44	3,060	—365	—365	203,000			466	436			556	556
4-1-45	2,535	—525	—890	490,540			234	1,229			548	551
10-1-45	2,316	—219	—1,109	611,285			183	554			551	551
4-1-46	2,082	—234	—1,343	744,731	8,640		182	734	48		570	555
10-1-46	2,044	—38	—1,381	861,634	14,317	62,000	183	639	31	339	3,076	624
4-1-47	1,936	—108	—1,489	1,040,085	22,164	158,178	182	981	43	828	1,659	699
10-1-47	2,207	+271	—1,218	1,273,390	29,526	634,790	183	1,275	40	2,604		1,046
4-1-48	2,435	+228	—990	1,566,852	44,823	1,079,157	183	1,603	86	2,428		1,583
10-1-48	2,448	+10	—977	1,928,232	83,803	1,486,965	183	1,975	213	2,228		1,974
4-1-49	2,638	+190	—787	2,322,388	137,567	2,061,695	182	2,166	295	3,158		2,951
10-1-49	2,952	+314	—473	2,732,768	189,092	2,625,083	183	2,243	243	3,079		5,778
4-1-50	2,913	—89	—512	3,154,281	241,547	3,075,713	182	2,316	327	2,476		6,161

of recovery from laboratory data was 170 bbl/psid. (See Table II, Item 19.) The closest approach to this value was 248 bbl/psid which was observed during the first interval between March 5, 1944, and August 8, 1944. Thereafter the rate of recovery increased enormously, averaging 1,147 and 6,061 bbl/psid during the following two intervals. This was very good evidence of the presence of natural water influx. Conclusive evidence was obtained when the producing rate was decreased to 1,027 B/D between October 1, 1945, and April 1, 1946, resulting in a 42 psi increase in reservoir pressure for that period.

The pressure behavior indicates that the natural water influx can sustain only a total outlet of about 1,000 B/D of stock tank oil with no water production. Water injection, therefore, was considered necessary in order to achieve a higher producing rate, to increase ultimate recovery by maintaining reservoir pressure and to control water influx. Water injection was started and, on Table IV and Fig. 4, it should be noted that pressures are now fairly stable around 3,000 psi at an average withdrawal rate of about 1,500 B/D. The bbl/psid relationship becomes meaningless on an interval basis once pressure begins increasing but on a cumulative basis, a tendency for the figure to level off indicates stable conditions. On Table IV it is noted that the cumulative bbl/psid was at a fairly constant value between October 1, 1945, and October 1, 1947. This indicated fairly stable conditions at rates of about 1,000 B/D. Subsequent increase in injection rates resulted in better movement of water into the reservoir, as evidenced by an increase to 3,547 bbl/psid at a 1,510 B/D average withdrawal rate.

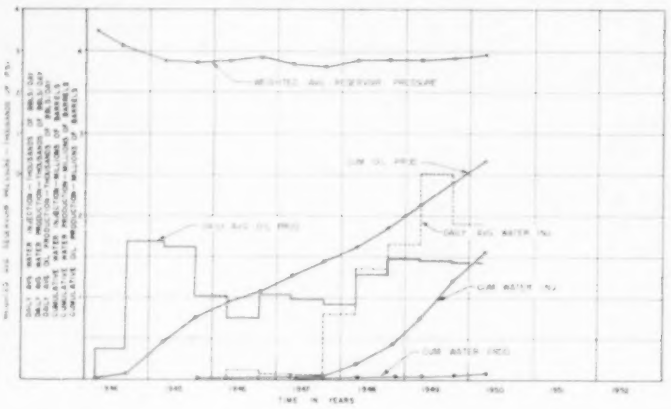

FIG. 4 — PRESSURE AND PRODUCTION STATISTICS FOR THE HILL SAND RESERVOIR

Evidence of water influx into the reservoir has also been apparent from the behavior of producing wells located low on the structure. Table IV indicates some water production between October 1, 1945, and October 1, 1946. These wells were subsequently recompleted as Bacon or Pittsburg oil producing wells, and no water was produced during the following year. Beginning with the October 1, 1947, period, however, other edge wells began producing small quantities of water, which has increased steadily and which will probably continue to increase as the reservoir is depleted. Reference to Fig. 2 shows that the Hill reservoir is the smallest of all in area and, because of this, it also contains the fewest number of producing wells — 16 at present. In order to combat the problem of water production from Hill wells, plans are now under way for the injection of water at rates sufficient to return the reservoir pressure at least to its original value. The attainment of this goal would permit the flowing of Hill production to a much higher water cut, resulting in a saving in lifting costs.

Table IV — Pressure and Production Statistics for the Hill Sand Reservoir, New Hope Field, Franklin County, Texas

Date	Wtd. Avg. Reservoir Pressure psig	Pressure Change		Est. Volume Cumulative Stock Tank Oil Produced Bbl	Cumulative Water Produced Bbl	Cumulative Water Injected Bbl	Time Interval Days	Interval Rate of Prod. or Injection, B/D			Oil Recovery Stock-Tank Bbl/psi Drop	
		Per Interval psi	Cumulative psi					Oil Prod.	Wtr. Prod.	Wtr. Inj.	Per Inter.	Cumulative
3-8-44	3,425											
8-8-44	3,135	−290	−290	72,000			156	462			248	248
4-1-45	2,780	−346	−636	469,000			234	1,697			1,147	737
10-1-45	2,740	−40	−683	766,000			183	1,623			6,061	1,118
4-1-46	2,782	+42	−643	953,000	3,000		182	1,027	33			1,482
10-1-46	2,872	+90	−553	1,091,000	17,653	27,000	183	754	80	143		1,973
4-1-47	2,717	−155	−708	1,281,000	17,653	43,619	182	1,055	0	91		1,832
10-1-47	2,662	−55	−763	1,465,932	17,653	54,092	183	1,000	0	58		1,921
4-1-48	2,809	+147	−616	1,639,608	19,244	206,150	183	949	9	831		2,662
10-1-48	2,828	+19	−597	1,879,286	23,149	461,199	183	1,310	21	1,394		3,148
4-1-49	2,817	−11	−608	2,156,432	31,764	768,479	182	1,523	47	1,688		3,547
10-1-49	2,894	+77	−531	2,428,662	38,842	1,234,050	183	1,488	39	2,344		4,574
4-1-50	2,984	+90	−441	2,694,899	59,834	1,654,551	182	1,463	118	2,310		6,109

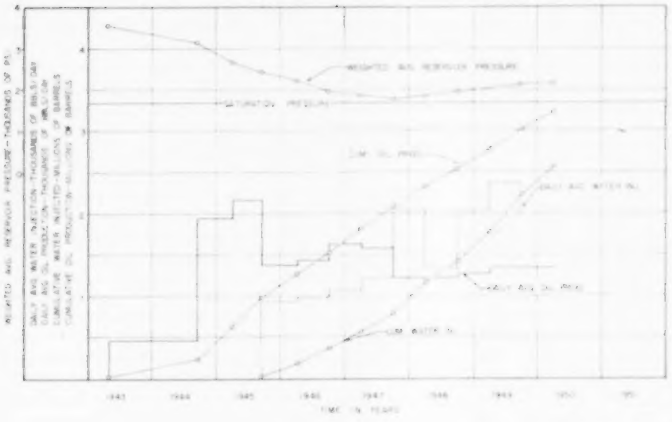

FIG. 5 — PRESSURE AND PRODUCTION STATISTICS FOR THE PITTSBURG SAND RESERVOIR.

Pittsburg Sand Reservoir

Table II shows that the permeability of the Pittsburg Reservoir averages 61.1 md. which is the lowest permeability of the three reservoirs under consideration. In addition to this, the Pittsburg sand has the least favorable permeability distribution of the three reservoirs. Table II, Item 19, also indicates that the production pressure behavior of the Pittsburg Reservoir should be on the order of 458 bbl/psid if no natural water influx is available. The first production pressure relationship, as shown on Table V, was observed for the period April 26, 1943, to September 12, 1944, to be 583 bbl/psid. This value is consistent in that with low initial water influx it was, and should have been the lowest value observed from field data. This relationship continued to increase with observation of successive intervals, indicating the presence of some natural water influx. However, the slow rate of increase (in comparison with the Hill Reservoir for instance) indicated that the natural water drive was not effective. Note that the production relationship for the Hill Reservoir, on an interval basis, increased almost 25 times over its initial observed value and that, at best, that rate could sustain only 1,000 B/D of oil production from that reservoir. By contrast, the production pressure relationship for the Pittsburg Reservoir over an equivalent period barely doubled in value. These indications, together with the high rate of pressure decline and the high order of saturation pressure, made it imperative that the first water injection equipment obtainable be placed in operation for the Pittsburg Reservoir. The first water injection experiments were conducted on Pittsburg Reservoir wells and, until April 1, 1949, more water had been injected into this reservoir than into either the Hill or the Bacon. Table V shows that, although the Pittsburg response has been poor, a reversal in downward pressure trend was finally achieved just short of saturation pressure by the combined influence of decreased average oil producing rates and increasing average water injection rates. It should be noted that pressures have been increasing since October 1, 1947, resulting in a steady increase in the cumulative pressure/production relationship.

OIL RECOVERY

Reservoir performance history shows that the Bacon and Pittsburg reservoirs would have been controlled by solution drive, and that the Hill Reservoir had a partial water drive. Estimates of recovery by natural means were made using the method outlined by Babson[1] for the Bacon and Pittsburg. For the Hill, however, additional estimates based on availability of reservoir water,

Table V — Pressure and Production Statistics for the Pittsburg Sand Reservoir, New Hope Field

Date	Wtd. Avg. Reservoir Pressure psig	Pressure Change		Est. Volume Cumulative Stock Tank Oil Produced Bbl	Cumulative Water Injected Bbl	Time Interval Days	Interval Rate or Prod. or Inj. B/D		Oil Recovery-Stock Tank Bbl/psi Drop	
		Interval, psi	Cumulative, psi				Stock Tank Oil Prod.	Water Injection	Per Interval	Cumulative
1-26-43	3,523			0						
9-12-44	3,126	−397	−397	231,400		504	459		583	583
4-1-45	2,671	−455	−852	619,400		200	1,940		853	727
9-12-45	2,409	−262	−1,114	975,899		165	2,161		1,361	876
4-1-46	2,220	−189	−1,303	1,251,798	188,000	200	1,379	940	1,460	961
10-1-46	1,958	−262	−1,565	1,514,450	367,000	183	1,435	978	1,002	968
4-1-47	1,858	−100	−1,665	1,809,371	562,396	182	1,020	1,073	2,949	1,087
10-1-47	1,790	−68	−1,733	2,096,506	784,808	183	1,570	1,216	4,224	1,210
4-1-48	1,840	+50	−1,683	2,318,222	1,159,671	183	1,211	2,048		1,377
10-1-48	1,971	+131	−1,552	2,540,735	1,401,052	183	1,216	1,319		1,637
4-1-49	2,012	+41	−1,511	2,770,235	1,771,041	182	1,261	2,033		1,833
10-1-49	2,126	+114	−1,397	3,013,257	2,203,385	183	1,328	2,363		2,157
4-1-50	2,131	+5	−1,392	3,255,257	2,567,285	182	1,330	2,000		2,339

flood pot experiments, and permeability distribution were made. As a result of this work it was found that normal recovery from the Bacon Reservoir would have been 170 bbl per acre ft, from the Hill 260 bbl per acre ft, and from the Pittsburg 155 bbl per acre ft. The increase in recovery, due to water injection, was originally estimated to be at least 45 per cent on the basis of permeability distribution.

Indications to date are that the three reservoirs have been responding to water injection with no evidence of channeling. Because of the favorable reaction it is now believed that the ultimate recovery from the three reservoirs will be increased at least 70 per cent over that recoverable by natural means.

HISTORY OF FLOOD PATTERN DEVELOPMENT

Bacon Reservoir

In the Bacon Reservoir a break-through pattern became evident early in 1948, after injection well No. 4, which, at that time, had taken 410,000 bbl of injected water. This volume of water in turn represented reservoir oil which had been displaced out of the partially flooded area. The three producing wells immediately adjacent to injection well No. 4 were affected: the first on December 23, 1947, with an initial water cut of 15 per cent, the second on January 8, 1948, with initial water cut of 5 per cent, and the third on March 1, 1948, with an initial water cut of 34 per cent. The fact that these wells began making water within three months of one another indicated that the invaded region was expending uniformly. This in turn was an indication of the absence of channeling. Subsequent history shows that by October 1, 1948, the water production from these wells had increased to 72, 40, and 80 per cent respectively. About that time injection well No. 7 (see Fig. 2) was completed and water input into injection well No. 4 was reduced to that quantity produced only by the three adjacent oil wells. As of August 1, 1949, the water production from these same three wells was 67, 44, and 4 per cent respectively, injection well No. 4 having taken 634,764 bbl of water.

On September 1, 1950, the status of these wells was as follows: N10, 60 and 4 per cent respectively. The first well, a west offset, has been shut down and its allowable transferred to other wells in the field, as provided by Railroad Commission field rules. The third well, a northwest offset, lies between injection wells 4 and 7. The behavior of this well proves the effectiveness of injection well No. 7.

In May, 1949, one of the producers offsetting injection well No. 3 began making 3 per cent water and by September, 1949, water had broken into the three nearest wells. At that time injection well No. 3 had taken 634,000 bbl of water into the Bacon. In June, 1950, one additional offset well began making water, bringing the total water producers in this group to four. Beginning in April, 1950, however, the rate into injection well No. 3 was reduced to the equivalent water production from its offsets, and in September, 1950, water injection into this well was discontinued. Prior to curtailing water injection into No. 3 the offset water producing wells tended to make increasing amounts of water. After curtailing water injection into No. 3, the water production from the offset wells either stopped rising or began to decrease. One well lying between injection wells 3 and 7 started flowing pipe line oil again. This is further evidence of the effectiveness of injection well No. 7.

Injection well No. 7 was drilled for the purpose of flooding oil out of the north and northeast portions of the Bacon and Pittsburg reservoirs. This well was completed and water injection into the Bacon started in September, 1948. Initial water break-through into the two nearest offset producing wells took place almost simultaneously in March, 1950, and by this time injection well No. 7 had taken 526,000 bbl of water. By September 1, 1950, this well had taken 698,000 bbl of water. The west offset producer had been shut down and the southeast offset was making 65 per cent water.

Injection well No. 1 had taken 815,000 bbl of water as of September 1, 1950, but as yet there has been no water break-through into its immediate offsets.

Injection well No. 6 had taken 244,000 bbl of water by March, 1950, at which time one Bacon producer on the west edge of the field began to make water. As of September 1, 1950, well No. 6 had taken 322,000 bbl of water and the break-through well was producing 20 per cent water.

Injection well No. 9 was drilled for

Table VI — Summary Showing Average Performance of New Hope Field Water Injection Wells in the Order in Which They Were Converted

No. on Map 1	Injection Well Zones	Date of Initial Injection	Water Injection Capacity (1) B/D	Well Head Injection Pressure (1) psig	Average Injection Rate 9-1-50, B/D
1	Lester Gilbert "A"-2				
	Bacon	Apr., 1946	700	3,900	200
	Pittsburg	Oct., 1945	350	3,800	300
2	H. V. Hanvie #1				
	Hill	June, 1946	1,450	1,400	—
	Pittsburg	Oct., 1945	490	4,000	220
3	R. A. Gilbert #1				
	Bacon	Apr., 1947	750	1,900	—
	Pittsburg	Feb., 1948	370	4,000	250
4	L. E. Minshew #1				
	Bacon	May, 1947	1,100	1,800	450
	Pittsburg	Mar., 1947	200	4,000	—
5	T. Alexander #2				
	Hill	Nov., 1947	1,360	750	1,170
	Pittsburg	Aug., 1947	550	750	350
6	T. E. Hewett #1				
	Bacon	July, 1948	475	1,850	450
	Pittsburg	Sept., 1948	810	3,750	500
7	T. Alexander #3				
	Bacon	Oct., 1948	1,550	1,500	1,400
	Pittsburg	Sept., 1948	330	3,000	300
8	B. B. Rhoades B-1				
	Hill	Sept., 1950	1,800	1,800	1,700
	Pittsburg	Sept., 1950	250	3,200	250
9	New Hope Unit 11				
	Bacon	Sept., 1950	1,800	2,000	1,100
	Pittsburg	Sept., 1950	800	3,000	700

the purpose of flooding oil out of the south and southeast portions of the Bacon and Pittburg reservoirs. This well was completed and water injection started in September, 1950. Although this well has not had time to take a large volume of water, it is anticipated that it will function equally as well as injection well No. 7.

One characteristic observed is that the principal direction of a water front is toward the center of the reservoir, rather than around the periphery. The reason for this behavior may lie in the fact that the average capacity (md-ft) approaches zero near the reservoir limits and that most of the oil withdrawal is from the central area which has a high relative capacity. The location and behavior of the water producing wells is particularly encouraging. The experience accumulated to date gives evidence that as yet there has been no channeling of injected water.

Hill Sand

In the Hill there is evidence of water encroachment along the south and east flanks of the reservoir. Evidence concerning the present position of the water front on the north flank of the reservoir is still inconclusive because most of the Hill producing wells in that area are completed high in the sand. Injection well No. 8 was converted from a Bacon producer to a Hill-Pittsburg water injection well in September, 1950. Water injection into this area has not been sufficient to warrant further discussion at this time.

Pittsburg Sand

In the Pittsburg sand one water break-through has been observed, this being in the offset producer nearest injection well No. 6, which occurred in June, 1950. At that time the injection well had taken 323,000 bbl of water. As of September 1, 1950, well No. 6 had taken 356,000 bbl of water and the break-through well was producing 67 per cent water.

DEVELOPMENT OF THE WATER INJECTION PROGRAM

Because the initial calculations had indicated that the Pittsburg would be the most difficult reservoir to handle, it was decided that injection should be started there first. Accordingly, a dry hole (see Injection Well No. 1 on Fig. 2) located on the south flank of the reservoir was converted into an injection well. During the following experimental period, it developed that, instead of taking 7,000 B/D of water at 1,300 psi injection pressure as calculated from permeability data, the well required from 3,500 to 4,000 psi injection pressure to take only 400 B/D. The experience with this well indicated that the permeability of the Pittsburg Reservoir had decreased materially below the oil-water contact. This also accounted for the poor water drive as evidenced by pressure behavior. Injection of unaerated water into the shallow, low permeability sands in the Bradford Field in Pennsylvania under pressures in the 1,000 to 2,000 psi range had been proved practical, but there were no previous experience data available on water injection into deep horizons under the pressure conditions outlined above.[3]

The experimental period had to be continued. During this time, additional studies of the physical and chemical nature of the reservoir formations, together with the chemical properties of the available salt and fresh unaerated water, were made. No means were found by which injection pressures could be lowered without also decreasing the rate of water injection. Established practices in which the formations were shot with nitroglycerine and acidized, together with chemical and bacterial control of the injected waters, also failed to disclose any means of combating the problem. In short, the results of the experimental period disclosed that the only means of injecting water into the Pitt-burg Reservoir was by the continued injection of unaerated water into the first well at low rates and under the high pressures.

A second attempt was made by converting another dry hole into a Pittsburg injection well in the hope that a better injection well could be obtained. (See Injection Well No. 2, Fig. 2.) Water injection was started into this well on October 23, 1945. By that time, the first injection well had taken about 13,000 bbl into the Pittsburg while the Pittsburg Reservoir itself had produced about 1,000,000 bbl of oil with no water. The second Pittsburg injection well proved to be no better than the first as it would also take only about 500 B/D of unaerated water at 4,000 psi well-head injection pressure. Subsequent history shows that these two wells averaged about 940 B/D, while reservoir withdrawal rate was held to about 1,400 stock tank B/D. Although the 940 B/D rate was considered sufficient to cause some reflection in pressure decline, it was noted that no definite reaction was apparent which could be credited to water injection alone. Well No. 1 was subsequently converted to a Bacon-Pittsburg injection well. The Bacon section in Well No. 2, however, had neither porosity nor permeability and, for this reason, it was completed dually as a Hill-Pittsburg injection well. Subsequent development of the injection well program took place as shown on Table VI. The location of these wells, with respect to the various reservoirs, is shown on Fig. 1. All of the injection wells, with two exceptions, were converted from dry holes, non-commercial producers, or producing wells located within the reservoir limits.

Injection wells Nos. 7 and 9 were drilled intentionally as Bacon-Pittsburg water injection wells.

WATER SUPPLY AND FIELD SYSTEM

Extraneous water for the injection system has been supplied from three fresh water wells in the shallow Wilcox sands and one salt water well which is completed in the Woodbine sand. This water is delivered under pressure as needed to surface storage tanks by means of deep well centrifugal pumps. Particular caution has been exercised in keeping air away from this water once it reaches the surface. The system is completely closed and at no point is the line pressure allowed to go below five psig. Vessels are equipped so as to maintain a gas seal.

No difficulties are encountered in the injection of air-free extraneous water other than the unusually high injection pressures. No plugging action has been experienced to date because of extraneous water injection. Considerable difficulty has been experienced, however, in the attempt to inject produced water along with extraneous water into the Bacon Lime. A preliminary investigation disclosed the formation of precipitates with various mixtures of extraneous and produced water. A complete account of the problem is beyond the scope of this report. It should be stated, however, that to

date the injection of the comingled water along with various treating agents has been unsuccessful. Two injection wells (Nos. 4 and 7) were almost completely plugged as a result of these experiments, necessitating clean-out and acidizing operations to get them back in condition. The problem has since been overcome by injecting only produced-water into the Bacon section of injection well No. 4. This well is now taking all of the produced-water under vacuum. Although the injection of comingled water has presented a challenge, it is believed that additional research and experiments will eventually provide a complete solution of the problem.

The water is injected into the high pressure wells by means of vertical type, positive displacement, triplex pumps. These pumps can operate at pressures up to 5,000 psi. Water for the lower pressure wells is injected by means of horizontal, positive displacement reciprocating pumps similar to those used in the East Texas Field and other areas. These pumps can operate up to about 2,000 psi.

Experience has shown that it has not been practical to inject the salt water at very high pressures. Much difficulty was encountered in the attempt to inject salt water into the Pittsburg Reservoir under pressures in the 4,000 psi range. Most of the down-time was caused by plunger scoring and packing failures resulting from this attempt. For this reason it has been necessary to inject only fresh water into the Pittsburg sand. The salt water, therefore, has been diverted to the lower pressure systems serving the Bacon and Hill reservoirs, and the resulting performance has been much more satisfactory. With existing equipment, the injection of fresh water is limited mainly by the ability of the overburden to withstand the pressure imposed. For this reason, Pittsburg well head injection pressures are kept below 4,000 psig. Fig. 2 shows how the various field lines, pumping stations and water supply wells are located with respect to the water injection wells. These systems are tied in with one another so that it is possible to deliver salt water or fresh water to the injection wells as needed.

CONCLUSION

The project, while still in its preliminary stage, has demonstrated the feasibility of controlling reservoir pressures by the injection of water even under difficult conditions. From an operating viewpoint, the maintenance of pressure alone has been worthwhile by sustaining flowing production from all except a few wells. Indications had already become apparent that it would be difficult to produce the wells by artificial lift with low fluid levels, particularly with gas coming out of solution in the immediate vicinity of the producing wells.

We believe that the project is a step forward in the practical application of sound engineering principles in the control of reservoir performance for the purpose of increasing ultimate recovery, and perhaps most important of all for the prevention of reservoir waste and the conservation of natural resources.

ACKNOWLEDGMENT

Appreciation is expressed to the respective managements of Tide Water Associated Oil Co. and Seaboard Oil Co. of Delaware for permission to publish this report.

Special acknowledgment is given E. B. Miller, Jr., for his helpful suggestions in preparing the paper. Special acknowledgment is also expressed to the New Hope Field production personnel, and especially to R. H. Coe, H. P. Shackleford, H. D. Spires, and J. L. Grolemund, who have been largely responsible for carrying on the field operations since discovery.

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Oil And Gas Developments In Oklahoma During 1949

SOUTHEASTERN AND SOUTHWESTERN OKLAHOMA

By DWIGHT L. BECKER,* Member AIME

During 1949, the southeastern and southwestern districts figured prominently in the state's development program and contributed 49 per cent of all wells drilled in the state. The two districts had 45 per cent of the exploratory wells, 30 per cent of the new oil fields, 33 per cent of the new gas fields, and 45 per cent of the total dry holes. The 20 new oil and three new gas pools discovered contributed substantially to the state's producing ability and reserves. Although exploratory drilling was quite active, there was a tendency to drill in and around previously discovered areas. More than 75 per cent of the wells drilled fell in this category and are more significant in that their contribution to reserves were greater than that of new pools found.

The more important of the 1949 discoveries were South Panther Creek and Northeast Hoady in Garvin County; Southeast Bebee in Pontotoc County; and South Palacine and West Sholem-Alechem in Stephens County. Oil discoveries which appear to be of lesser importance include East Brock and North Healdton in Carter County; West Rabbit Creek in Cotton County; Southeast Katy, Southwest Paoli, and Southeast Hobberson in Garvin County; Northeast Marlow in Grady County; Greenville in Love County; East Bradley in McClain County; West Bebee, East Hart, and Mount in Pontotoc County; and Southeast Doyle, Northeast Palacine, and Murray in Stephens County. Of these 20 oil discoveries, only seven have more than two wells and are not sufficiently developed to evaluate them. The following is a brief discussion of the more important discoveries for the year.

GARVIN COUNTY

South Panther Creek

The discovery well was the Davon No. 1 Layton in Section 36-3N-3W. Drilled to 7,427 in Mississippian, the well was plugged back and completed from Pennsylvanian sand perforations 7306-48, flowing 115 bbl of 63 gravity oil and 2,800,000 cu ft of gas daily through ½-in. choke. The pool is being developed on 40-acre spacing, and it is quite possible it may connect with Panther Creek one mile northwest.

Northeast Hoady

This pool was opened by the Stanolind No. 1 Richardson Unit in Section 1-1N-1W. Drilled to 4,664 in Sylvan, the well was plugged back and the Pennsylvanian perforated from 4573-89. After treating with 2,000 gal of acid, the well was completed flowing 80 B/D through 8/64-in. choke. To date, seven wells have been completed on 40-acre spacing and the northwestern limits of the pool established.

Southeast Bebee

W. C. McBride No. 1 Braly in Section 9-4N-5E, the discovery well, was drilled to the Arbuckle, plugged back and completed from perforations 2052-59 opposite the Viola. After treating with 500 gal of acid, the well flowed 315 bbl of 37 gravity oil in nine hours through a 3/4-in. choke. Development to date on 10-acre spacing indicates the pool will be small.

STEPHENS COUNTY

South Palacine

The pool opener, the J. E. Jackson No. 1 Hughes in Section 16-2S-6W, was completed in April, pumping 52 bbl of 38 gravity oil from a Pennsylvanian sand 2686-94. Subsequent development has established production from the Arbuckle as well as two additional Pennsylvanian sand zones. Development is progressing on 10-acre spacing, and it is probable the productive area will exceed 1,200 acres.

West Sholem-Alechem

The discovery well was the Davon No. 1 Hue in Section 22-1S-4W. Originally drilled by the Gulf to 6,509 ft in Dornick Hills, it was abandoned in 1947. The well was taken over by Davon and re-drilled to 3,592 ft. Casing was set at 3,542 ft and completed flowing 71 bbl of 34 gravity oil daily from a Pennsylvanian sand. The pool is being developed on 10-acre spacing, and it is probable the producing area will be small.

New Gas Pools

Of the three new gas fields discovered, none have been developed sufficiently to evaluate their importance.

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DEVELOPMENT IN FIELDS DISCOVERED PRIOR TO 1949

Development in and around old fields was very active during the year. The southeastern district registered a net gain of 68 producing oil wells during the year. The southwestern district was considerably more active and registered a net gain of 1,182 producing oil wells. Counties which figured prominently in new oil producing wells were Beckham 26, Caddo 52, Carter 357, Comanche 49, Cotton 38, Garvin 334, Grady 39, Jefferson 24, McClain 32, Pontotoc 93, and Stephens 332. Most of the Beckham County activity was due to extensions and development at Elk City. Shallow wells at Cement were responsible for most of the increase in Caddo County. In Carter County, 22 wells were added at West Brock, 94 at Hewitt, 115 at Sholem-Alechem, 90 at Tatums, and 27 at Wheeler. In Comanche County, Lawton contributed 54 new producers. In Garvin County, Southwest Antioch led in development with 58 new wells; Northwest Hoover followed with 46. Other important contributors were Northeast Elmore 34, Southeast New Hope 27, Southwest Mayesville 26, Katie 20, and South Panther Creek 19. In Grady County, 36 wells were added at Knox. East Lindsay contributed 32 wells to McClain County. In Stephens County, Velma again led with 96 new wells, while North Alma contributed 36.

The more outstanding development in old pools was a substantial southeastward extension of the Velma Pennsylvanian sand production. To date, this extension has not been defined and will ultimately add considerable additional producing area to the field. Extension in all directions at Sholem-Alechem was also important. The probability that this field will be developed on a 10-acre rather than the existing 20-acre spacing may involve con-

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR SOUTHEASTERN OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	THOUSAND BARRELS TO END OF 1949	THOUSAND BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
	Bryan											
1	Aylesworth (Southeast)	Cret, Simpson, Ord	1945	200	131	19						
	Carter [c]											
2	Arbuckle	Springer, Pen	1942	80	508	80						
3	Brock	Pen Sd, Arb, Ord	1922	300	4,103	134						
4	Brock (East)	Simpson, Ord	1949	40	.4	.4						
5	Caddo	Woodford, Mis	1939	40	97	9						
6	Caddo (Deep)	Simpson, Ord	1942	120	150	0						
7	Caddo (North)	Sycamore, Mis Hunton, Sil-Dev Simpson, Ord	1944	100 100	83	6						
	Choctaw											
8	Centrahoma	McAlester, Pen Cromwell, Pen Simpson, Ord	1937	150	224	16						
9	Clarita	Atoka, Pen	1937	80	131	14						
10	Soerlser	Cromwell, Pen	1941	10	1	0						
	Garvin											
11	Butterly (Northwest)	Simpson, Ord	1945	500	1,225	111						
12	Lewis	Simpson, Ord	1944	60	183	28						
13	Meloy	Pen, Sil	1945	40	58	4						
14	Pauls Valley	Pen Sd, Bromide, Ord	1942	1,700	17,325	1,493						
15	Pauls Valley (East)	Pen Sd, Bromide, Ord	1944	1,740	3,319	246						
16	Pauls Valley (West)	Viola, Ord	1944	20	1	0						
17	Woods			20	15	0						
	Hughes											
18	Citra	Simpson, Ord	1937	20	6	0						
	Jete											
19	Greenville	Deese, Pen	1949	40	2	2						
20	Marietta (North)	Viola, Ord	1937	20	11	.6						
21	Overbrook	Springer, Pen	1943	10	6	0						
	McClain											
22	Byars	Lawton, Pen, Viola, Ord	1939	300	830	19						
23	Byars Townsite	Viola, Ord	1948	40	19	6						
24	Johnsonville	Viola, Ord	1948	80	37	34						
	Marshall											
25	Aylesworth	Trinity, Cret, Simpson, Ord	1942	1,000	2,659	365						
26	Aylesworth (Northwest)	Simpson, Ord	1945	140	281	62						
27	Cumberland	Bromide, McLish, Ord	1940	2,170	33,133	3,348						
28	Enos	Preston-Arb Sd, Cret	1933	265	221	8						
29	Ioan Springs	Stray Sd, Cret	1931	380	323	9						
30	Kingston	Trinity, Cret	1932	115	23	.7						
31	Mutill	Hilbs-Arbuckle Sd, Cret	1925	275	1,187	14						
32	Duffy				1	0						
	Murray											
33	Sandy Creek	Oil Creek, Ord	1948	20	.2	0						
34	Sulphur (Northwest)	Simpson, Ord	1947	100	73	31						
	Pontotoc											
35	Ada (East)	Boggy, Senora, Gil, Pen	1928	325	442	29						
36	Allen (Shallow)	Allen	1913	2,530	9,594	108						

siderable activity through 1950.

EXPLORATION AND LEASING

Exploratory drilling was very active in the southern part of the state during the year. Many of the so-called exploratory tests completed as producers may eventually become a part of previously existing fields. The southern district had 45 per cent of the total exploratory well completions and 30 per cent of the total exploratory oil well completions. Cotton County led the district with 44 tests, followed by Garvin with 36, Stephens 24, Jefferson 24, Comanche 18, and Kiowa 11.

Leasing activity in the southeastern part of the state was primarily confined to the McAlester Basin Area in Pittsburg, McIntosh, and Latimer Counties. Further west, Love County came in for considerable activity as a result of the Sohio discovery. The extreme northern part of the southwestern district continued active with Beckham and Roger Mills Counties being favored.

SUMMARY

The southeastern and southwestern districts contributed almost 50 per cent of the wells drilled in the state during 1949. Most of the activity and new reserves added resulted from extensions and development of fields discovered prior to 1949. Many of these fields will require additional wells both inside and outside current producing limits. Drilling in the older areas, together with development of new producing areas established during the year, indicates 1950 will be one of the most active in the history of the district.

DWIGHT L. BECKER

LINE NUMBER	NUMBER OF WELLS[6]			WELLS PRODUCING[7] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[8]	CHARACTER OF OIL[9]		PRODUCING FORMATION					DEEPEST ZONE TESTED[10] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[1]	POROSITY PER CENT	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT. NET	STRUCTURE[5]	NAME	DEPTH OF HOLE FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
1	5	0	0	3	0	2				44		SL		2,980	60	A F	Simpson	4,119
2	4	0	0	0	4	0				32		S		3,302	40	A	Springer	4,205
3		8			150					32		SL	1,300-	2,200		A F	Arbuckle	3,930
4	1	1			1					41		S		3,840	20	A	Arbuckle	6,330
5	1	0	0	0	1	0				35		S		4,170	154	A	Arbuckle	8,500
6			Abd.		Abd.													
7	6	0	0	0	6	0				40		SL		3,930		A	Arbuckle	7,472
8	5	2	0	0	5	0				38		SL		5,970			Simpson	7,126
9	5	2	0	0	5	0				39		S		700	46		Simpson	5,763
10			Abd.		Abd.													
11	12	0	0	0	12	0				14		S		3,990	15		Simpson	4,555
12	6	1	0	0	4	0				29		S		1,897	65		Arbuckle	2,904
13	2	0	0	0	2	0				35		L		2,492	6		Simpson	3,542
14	94	0	2		76					42		SL		3,990	50	A	Simpson	4,705
15	92	1			89					33		S		2,960		A	Simpson	3,250
16			Abd.		Abd.					40		L		4,463	40		Simpson	4,890
17			Abd.		Abd.													
18			Abd.		Abd.													
19	1	1			1					42		S		6,285	50	A	Fen	7,147
20	3				1					40		L		2,427	43			7,303
21	1				1					39		S		3,190	40		Fen	4,510
22	7				7					37		SL		3,485	138		Simpson	4,078
23	1				1					15		L		4,171	30	A	Simpson	4,480
24	2	1			2					16		L		4,040	30	A	Simpson	5,589
25	48	0	1	11	30	6				36		S-SL		3,110		A F	Simpson	3,961
26	6	1		5		1				38		SL		3,130	30	A F	Simpson	3,486
27	149			125	18	2				35		S-SL		5,970	60	A F	Arbuckle	7,500
28					25					25		S		515	8		Arbuckle Sd.	585
29		2			67					26		S		903	12		Cret. Sd.	603
30					9					40		S		400		A F		
31					45													
32			Abd.		Abd.													
33	1				1					18		S		1,617	20		Arbuckle	2,223
34	7	1			7					16		S		1,490	50	A F	Arbuckle	1,941
35		2			11					25		S		1,790	5		Simpson	4,500
36		8			185					30		S						

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTHEASTERN OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	THOUSAND BARRELS TO END OF 1949	THOUSAND BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
37	Bebee	Boggy, Senora, Pen Hunton, Sil-Dev, Viola, Ord	1923	2,800	18,193	757						
38	Bebee (East)	Senora, Pen Hunton, Sil-Dev, Viola, Simpson, Ord	1930	215	655	23						
39	Bebee (Southeast)	Pen Sd, Pen Hunton, Sil-Dev, Viola, Ord	1949	280	103	103						
40	Bebee (West)	Viola, Ord	1949	40	2	2						
41	Byng (North)	Thurman, Pen Hunton, Sil-Dev	1945	220	216	21						
42	Conservation	Deese, Pen Hunton, Sil-Dev	1927	285	707	32						
43	Fitts	Various, Pen, Sil-Dev, Ord	1933	5,955	107,303	1,079						
44	Fitts (North)	McAlester, Gil, Pen	1934	150	695	12						
45	Fitts (South)	Calcrease, Pen Hunton, Sil-Dev, Viola, Simpson, Ord	1937	205	732	24						
46	Fitts (West)	Cromwell, Pen	1937	175	718	30						
47	Francis	Allen, Senora, Pen	1918	-	x	0						
48	Francis (West)	Allen, Senora, Calcrease, Cromwell, Pen	1917	100	x	15						
49	Hart (East)	Simpson, Ord	1949	40	1	1						
50	Hird (Southeast)	Senora, Pen	1948	80	14	6						
51	Jesse	Deese, Pen Hunton, Sil-Dev, Simpson, Ord	1935	1,235	8,830	228						
52	Mount	Pen Sd & Ls	1949	20	.3	.3						
53	Oakman	Calvin, Cromwell, Pen Hunton, Sil-Dev	1935	140	111	15						
54	Roper	Hunton, Sil-Dev Viola, Ord	1936	190	308	22						
55	Steedman		1920		23	0						
56	Steedman (North)	Allen, Calcrease, Pen Misener, Miss	1928	370	2,340	93						
57	Adair	Senora, Pen	1947	20	.6	.1						
58	Britt	Calcrease, Pen	1947	60	54	30						
59	Fitts (East)	Cromwell	1944	60	7	2						
60					4	0						
61	Wilfong	Viola, Ord	1948	200	44	19						
62	Aggregate total for pools marked x				303							
63	Total Southeastern Oklahoma				217,755	8,901						

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[i] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG. /END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[j]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. NET	STRUCTURE[k]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
37		35			237					36		S-L		2,500	40			
38	20				17					35		S-L		2,500	25		Simpson	2,740
39	17	17			17					37		S-L		1,430-2,050	Var.		Arbuckle	3,360
40	1	1			1					36		L		2,170	5		Simpson	2,415
41	19				18	1				36		S-L		1,660	20		Simpson	3,038
42					19					30		S-L		1,650	6		Simpson	3,430
43	989		16		477					39		S-L		Var.	Var.		Arbuckle	5,356
44			3		8					37		S		1,675	17		Simpson	5,835
45					20					35		S-L		Var.	Var.		Simpson	5,253
46					11					39		S		3,200	30		Simpson	4,966
47			Abd.		Abd.					37		S		Var.	Var.		Simpson	3,185
48		1			9													
49	1	1			1					30		S		1,700	10		Simpson	2,000
50	4				3	1				40		S		1,130	30		Hunton	3,220
51			6		44					40		S-L		Var.	Var.		Arbuckle	5,761
52	1	1			1					30		S-L		740	15		Pen	1,823
53		1			17					37		S-L		Var.	Var.		Simpson	3,250
54					6					38		L		2,530	26		Simpson	2,690
55			Abd.		Abd.					31-39		S		Var.	Var.		Simpson	4,501
56		5			30													
57					2					29		S		730	15		Cromwell	2,765
58	5	1			5					32		S		1,490	12		Calcrease	1,492
59	1				1					38		S		3,700	30		Hunton	4,643
60			Abd.		Abd.					39		L		2,660			Trenton	3,145
61	5	1			5													
62																		
63		95	29	144	1,714													

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR SOUTHWESTERN OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION (Thousands of Bbl)	
				AREA PROVED ACRES	THOUSAND BARRELS TO END OF 1949	THOUSAND BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
	Beckham											
1	Elk City	Hoxbar, Deese, Pen	1947	5,000	856	938						
2	Erick	Granite Wash, Pen	1945	40	4	2						
3	Sayre	Deese, Pen	1923		805	0						
	Caddo											
4	Apache	Pontotoc, Pen Simpson, Ord	1941	1,000	16,102	1,749						
5	Binger	Deese, Pen	1934	80	87	0						
6	Cement	Various, Penn, Pen	1947	4,650	56,003	4,105						
7	Cement (North)	Marchand, Pen	1948	320	146	97						
	Carter											
8	Brock (West)	Pen Sd	1947	600	1,634	943						
9	Camp	Pen Sd, Springer, Pen	1945	240	514	264						
10	Ed Cox	Consolidate w/Tatums										
11	Fox	Consolidate w/Graham										
12	Fox-Graham	Various, Pen Hunton, Sil-Dev Simpson, Ord	1917	4,800	46,242	656						
13	Healdton	Various Pen, Various Ord	1913	7,550	230,960	2,531						
14	Healdton (North)	Pen Sd	1949	80	10	10						
15	Hewitt	Various Pen, Viola-Simpson, Ord	1919	5,000	109,681	2,692						
16	Hewitt (Northeast)	Deese, Pen	1948	200	37	36						
17	Homer (South)	Pen Sd	1946	40	3	0						
18	Lone Grove (Southeast)	Deese, Pen	1944	1,200	6,565	1,026						
19	Sholem Alechem	Hoxbar, Deese, Springer, Pen	1923	6,000	54,523	6,530						
20	Tatums	Pontotoc-Deese, Pen Arbuckle, Ord	1925	9,300	40,431	1,773						
21	Tussy	Consolidate w/Tatums										
22	Wheeler	Pontotoc, Deese, Pen	1904	1,100	1,565	100						
23	Wildcat Jim	Consolidate w/Tatums										
24	Wilish	Pen Sd	1937	80	0	2						
	Comanche											
25	Ft. Sill Reservation	Garber, Penn, Pontotoc, Pen	1943	280	361	47						
26	Hanbury	Various, Pen	1920	180	1	3						
27	Lawton		1915	2,000	1	49						
28	Mallun	Pontotoc, Pen	1943	60	3	3						
	Cotton											
29	Cache Creek	Pontotoc, Pen	1946	1,400	6,692	1,766						
30	Cache Creek (North)	Pontotoc, Pen	1947	20	2	0						
31	Cache Creek (West)	Pen Sd	1947	750	398	111						
32	Exasperatedlate	Pontotoc, Pen	1946	800	668	165						
33	Rabbit Creek (West)	Cisco Sd, Penn	1949	50	6	6						
34	Randlett (South)	Pen Sd	1947	150	149	70						
35	Randlett (Southwest)	Pen Sd	1947	200	172	98						
36	Soldier Creek	Pontotoc, Pen	1946	3,100	5,056	1,643						
37	Walters	Cisco, Hoxbar, Pen	1917	3,000	27,692	276						
38	Brown	Pen Sd	1947	20	1	0						
39	Fitzsimmons	Pen Sd	1947	200	121	57						
40	Jensen	Pen Sd	1947	300	152	61						
41	Warren	Pen	1947	60	90	43						
	Garvin											
42	Antioch	Pen Sd, Pen Bromide, Ord	1947	400	155	40						
43	Antioch (East)	Simpson, Ord	1945	240	67	3						
44	Antioch (Northeast)	Viola, Simpson, Ord	1947	80	19	4						
45	Antioch (Southeast)	Pen Sd	1947	120	38	15						
46	Antioch (Southwest)	Deese, Pen, Viola, Simpson, Ord	1946	6,700	10,455	4,099						
47	Brady (East)	Deese, Pen	1947	350	305	101						
48	Elmore (Northeast)	Deese, Pen	1947	3,000	3,707	2,054						
49	Eola	Simpson, Ord	1947	300	772	430						
50	Eola (Southwest)	Consol. w/ Robberson										
51	Erin Springs (Southeast)	Pen Sd	1948	40	29	14						
52	Foster (North)	Deese, Pen	1948	40	19	16						
53	Hoover (North)	Deese, Pen	1948	160	152	104						
54	Hoover (Northeast)	Pontotoc, Pen	1944	1,300	2,896	763						
55	Katie	Pen Sd	1946	2,000	1,760	721						
56	Katie (Southeast)	Pen Sd, Pen	1949	80	1	1						
57	Maysville (South)	Pen Sd, Pen	1947	400	270	135						
58	Maysville (Southeast)	Bromide	1946	120	88	85						
59	Maysville (Southwest)	Pen Sd, Pen, Viola, Bromide, Ord	1946	3,000	2,345	1,080						
60	New Hope (Southeast)	Deese, Pen	1947	5,300	1,673	1,249						
61	Panther Creek	Pen Sd, Pen	1948	300	145	40						
62	Panther Creek (South)	Pen Sd, Pen	1949	120	24	24						
63	Panther Creek (Southeast)	Pen Sd, Pen	1948	1,000	393	303						
64	Pauls (Southwest)	Pen Sd, Pen	1949	40	8	8						
65	Ready (Northeast)	Deese, Pen	1949	100	43	43						
66	Robberson	Pontotoc, Pen, Simpson, Arbuckle,	1921	2,400	17,671	367						
67	Robberson (Southeast)	Simpson, Ord	1949	160	11	11						

LINE NUMBER	NUMBER OF WELLS[6]			WELLS PRODUCING[7] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[8]	CHARACTER OF OIL[9]		PRODUCING FORMATION					DEEPEST ZONE TESTED[10] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[11]	POROSITY PER CENT	DEPTH TO TOP OF PRODUCING ZONE FT.	THICKNESS AVG. FT. NET	STRUCTURE	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
1	28	27		26	1					A5		L-Ls		9,800		A	Penn	13,133
2	1											Gr					Granite	7,559
3			Abd.		Abd.													
4	30		1	34	11					40		S		3,500	80	A F	Simpson	5,807
5	1		1		Abd.					38							Deese	11,234
6	754	48		98	595					34		S		Var.	Var.	A F	Deese	10,077
7	3	2		1						44		S		10,830	25	A	Deese	13,046
8	32	22			32					39		S		3,800-4,100	50-100		Simpson	4,800
9	20	10		15	5					32-36		S		4,200-6,340	80	A	Penn	6,962
10																		
11										30-38		S-L		Var.	Var.	A F	Simpson	8,345
12		1			140													
13	2,497	22			1,982					31		S-L		Var.	Var.	A F	Arbuckle	6,647
14	2	2		2						38		S		6,100-9,050	50		Penn	11,953
15	1,237	94			1,007					34		S-L		Var.	Var.	A	Arbuckle	5,007
16	4	3			4							S		2,930	30	A		7,440
17	2				2					30		S		490	21		Penn	530
18	102	4		22	80					36		S		2,760	50	A	Simpson	5,198
19	668	125			553					29		S		Var.	10-200	A	Miss-Casey	6,770
20		90			905					22-27		S-L		Var.	Var.	A	Penn	4,500
21																		
22		27			99					30		S		Var.	Var.	A	Penn	7,000
23																		
24	5				5					22		S		290	10		Simpson	8,281
25					16					36		S		500	30	A	Simpson	8,078
26	5				5					38		Ls-S		1,640	27		Pentotoc	2,197
27		54			194					30		Ls-S		390	40		Viola	1,015
28	2				1					34		S		1,050	12		Penn	7,301
29	292	11			292					35		S		1,250	18		Arbuckle	3,330
30	1				1					35		S		1,427	5		Penn	1,995
31	31	2			31					35		S		1,440	10	A	Penn	1,840
32	72	1			69					35		S		1,480	10	A	Arbuckle	3,511
33	3	3			3					40		S		1,750	10	A	Arbuckle	3,375
34	13	2			13					40		S		1,560	20	A	Canyon	2,157
35	17	1			17					39		S		1,560	7	A	Penn Sd	1,695
36	318	3			318					35		S		1,600	8	A	Penn	2,372
37	6				4					34		S		2,350	17	A	Arbuckle	4,326
38	1	1			20					35		S		1,550	10		Penn	1,560
39	20	2			20					34		S		1,860	6	A	Penn	2,071
40	30	2			30					40		T		1,640	8	A	Penn	2,505
41	5	3			5					40		T		1,740	20		Penn	1,623
42	8			8						42		S		5,550-6,300	15-25		Simpson	6,440
43	4		1		3					42		S		5,350	25		Simpson	5,742
44	2				2					38-43		S		5,760	20		Simpson	6,185
45	3				3					46		S		5,450	80		Simpson	6,383
46	164	58		164						42		S		6,370	45		Simpson	7,568
47	18				16					36		S		4,650	20		Viola	4,749
48	93	34		93						42		S		6,610	30		Simpson	8,134
49	7	3		7						40		S		10,960		A F	Simpson	10,818
50																		12,598
51	1				1					42		S		8,012	32	St	Simpson	7,940
52	2	1			2					44		S		7,775	39	St	Springer	5,561
53	4	1		3	1					47		S		4,455	25	St	Penn	4,993
54	125	46			125					38				1,000-2,000	Var.	A	Penn	7,905
55	48	20		20	28					40		S		6,070	14		Simpson	7,050
56	1	1			1					41		S		4,750	60		Simpson	7,045
57	9	4		9						41		S		6,220	30		Simpson	6,290
58	3	2		3						40		S		6,346	12	A F	Simpson	7,700
59	70	26		62	8					44		S		7,380	12		Simpson	
60	84	58		84						40		S		7,050	25	A	Simpson	9,371
61	5			5						45		S		7,080			Hunton	7,851
62	3	3		3						63		S		7,300	40		Miss	7,437
63	21	19		15	6					40		S		8,057	25		Springer	8,641
64	1	1		1						43		S		4,429	20		Simpson	4,714
65	7	7		7						28		S		4,720	20		Hunton	4,700
66	369	10		195						23		S-L		1,300-1,760	20	A	Arbuckle	4,275
67	4	4		4						31		S		990	30		Simpson	1,100

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTHWESTERN OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	THOUSAND BARRELS TO END OF 1949	THOUSAND BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
68	Dunham	Consol. w/New Hope S.E.										
69	Superior-Graham	Consol. w/Maysville S.F.										
	Grady											
70	Bradley (Northeast)	Bromide, Ord	1948	80	103	93						
71	Bradley (Southwest)	Pen	1947	40	5	0						
72	Cement (East)	Fortuna	1948	80	60	34						
73	Chickasha	Pen Sd	1948	60	3	1						
74	Chitwood	Pen Sd	1945	2,000	1,536	621						
75	Knox	Pen Sd	1924	2,400	21,738	2,199						
76	Marlow (Northeast)	Pen Sd	1949	40	2	2						
77	Chickasha (Northwest)	Pen Sd	1948	40	2	1						
78	Petzt	Pen Sd	1939	50	50	5						
	Greer											
79	Lake Creek			40	.3	.1						
	Jackson											
80	Altus	Granite Wash, Pen	1934	1,800	2,651	87						
81	Altus (East)	Granite Wash, Pen	1945	80	4	1						
82	Altus (Northeast)	Granite Wash, Pen	1946	40	6	1						
83	Tipton	Canyon, Pen, Arbuckle, Ord	1935	880	2,455	60						
	Jefferson											
84	Agbaltun	Pen Sd 1944	1949	80	.7	.7						
85	Oscar	Pen Sd	1924	800	13,535	437						
86	Ringling (North)	Pen Sd	1948	100	136	111						
87	Sway	Cisco-Hoxbar, Pen	1924	400	872	93						
88	Spring	Hoxbar-Deese, Pen	1924	100	x	84						
	Kiowa											
89	Carnegie (Southwest)	Pontotoc, Pen	1945	80	29	.3						
90	Hobart	Pontotoc, Pen Hunton, Sil-Dev, Viola, Ord	1939	500	1,699	25						
91	Hobart (Northeast)	Pontotoc, Springer, Pen	1945	300	1,179	184						
92	Kenalty	Pen	1949	60	1	1						
	Love											
93	Sawls Bend	Pen Sd	1946	80	53	24						
94	Stockton	Pen Sd	1936	150	128	33						
	McClain											
95	Blue Hill	Hunton, Sil-Dev	1946	80	31	3						
96	Bradley (East)	Hunton, Sil-Dev	1949	80	22	22						
97	Goldsby (Southwest)	Pen Sd	1948	80	49	47						
98	Iron Chapel	Simpson	1945	80	165	33						
99	Lindsay (East)	Simpson	1947	3,300	5,596	2,761						
100	Lindsay (North)	Pen Sd, Pen Hunton, Sil-Dev Viola, Simpson, Ord	1945	2,300	2,506	982						
101	Lindsay (Northeast)	Pen Sd, Pen Hunton, Sil-Dev Simpson, Ord	1947	1,500	1,779	560						
102	Newcastle (East)	Hunton, Sil-Dev	1948	280	47	30						
103	Newcastle (Southeast)	Hunton, Sil-Dev	1947	800	700	427						
104	Noble (West)	Simpson, Ord	1944	40	10	0						
105	Washington	Simpson, Ord	1945	600	1,093	194						
106	Wayne (Southwest)	Pen Sd, Pen Hunton, Sil-Dev	1946	2,000	1,125	210						
	Stephens											
107	Alma (North)	Dornick Hills, Pen	1946	1,000	984	546						
108	Bray (Southeast)	Pen Sd	1948	80	6	1						
109	Camp (Northwest)	Springer, Pen	1947	80	35	19						
110	Claud	Deese, Pen	1945	40	88	11						
111	Comanche	Consol. w/Empire										
112	Comanche Lake (South)	Pen Li	1946	80	15	6						
113	Cruce	Pontotoc, Hoxbar, Deese, Pen	1926	160	x	95						
114	Doyle	Hoxbar, Deese, Pen	1921	530	x	189						
115	Doyle Townsite	Pontotoc, Pen	1946	20	4	1						
116	Doyle (Southeast)	Pen Sd	1949	40	31	31						
117	Doyle (West)	Consol. w/Doyle										
118	Duncan (North)	Pen Sd	1920	1,200	5,124	103						
119	Duncan (Northeast)	Hoxbar, Pen	1947	80	26	5						
120	Duncan (West)	Brown, Blades, Pen	1919	900	9,227	350						
121	Empire-Comanche	Various, Pen	1920	3,600	x	643						
122	Loco	Pontotoc, Deese, Pen	1915	1,600	3,484	178						
123	Marlow (Northwest)	Pen Sd	1947	40	12	3						
124	Marlow (South)	Hoxbar, Pen	1945	320	78	26						
125	Marlow (Southeast)	Pen Sd	1948	80	11	10						
126	Marlow (West)	Pontotoc, Pen Sd	1937	760	500	114						
127	Milroy	Pontotoc, Pen Hunton, Sil-Dev Simpson, Ord	1916	800	4,262	168						
128	Palacine	Hoxbar, Pen, Deese, Arbuckle, Ord	1929	120	237	4						
129	Palacine (Northeast)	Arbuckle, Ord	1949	40	21	21						
130	Palacine (South)	Pen Sd, Pen Arbuckle, Ord	1949	400	241	241						
131	Ramola	Pontotoc, Pen	1921	150	x	30						

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. IN. (GAUGE)		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT./NET	STRUCTURE[p]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
68																		
69																		
70	1			1						46		S		13,127	125	A	Arbuckle	14,013
71	1		1		Abd.					48		S		14,150			Arbuckle	15,184
72	4				4					35		S		2,050	30		Penn	2,087
73	3																	
74	15	3		15						44		S		10,730	20	A	Penn	13,100
75	378	36		30	362					35		S		Var.	Var.	A F	Simpson	8,963
76	1	1			1					24		S		2,700	15		Penn	9,300
77	1				1													
78	1				1					36		S		3,250	14		Penn	3,360
79	5	4			5													
80		1			129					41		Gw		1,400	30	A	Granite	2,723
81	2				2					40		Gw		1,410	11		Arbuckle	2,976
82	1				1					40		Gw		1,395	9		Arbuckle	3,032
83					56					40		Gw-L		2,400	10	A	Arbuckle	2,776
84	8	2			2	6				39		S		1,600	30		Arbuckle	2,435
85		3			222					33		S		1,800	25		Arbuckle	3,358
86	7	6		3	4					34		S		2,700	60		Arbuckle	3,767
87		8			83					23		S		800		A	Granite	2,270
88		3			96					33		S		1,500	6	A	Arbuckle	2,342
89			7		4					21		L		770	12		Viola	975
90			1		10					35		Lw-S-L		1,090	16	A	Arbuckle	2,536
91	39	3			39					40		S		1,700	40	A		3,002
92	9	2			2					35		S-L		660-700	Var.		Hunton	767
93	2	1			2					37		S		6,174	10		Penn	7,383
94	4	3			4					36		S		6,760	34		Simpson	8,785
95	1				1					41		L		9,970	65		Hunton	10,392
96	1	1		1						41		L		10,250	60		Simpson	11,748
97	2	1		1						45		S		9,370	10		Penn	9,983
98	1			1						41		S		10,812	100	A	Simpson	11,237
99	74	32		76						43		S		9,600	70		Arbuckle	10,930
100	33	5		33						44		S-L		10,782	215		Arbuckle	12,398
101	38	1		28						42		L-S		10,400	60		Simpson	10,997
102	2				2					39		L		8,800	30		Simpson	9,433
103	19	6		19						43		L		8,785	46		Simpson	9,850
104			Abd.		Abd.					40		S		8,190	32		Simpson	8,222
105	5			5						39		S		10,625	20		Simpson	11,309
106	41			41						42		S-L		6,600	70		Simpson	7,977
107	44	36		44						30		S		5,400	60		Penn	7,158
108	1				1					35		S		10,048	30	A F	Penn	10,144
109	2	1			2					29		S		6,800	50		Penn	7,382
110	1				1					21		S		5,500	80		Penn	5,601
111																		
112	1				1					23		L		2,440	30		Penn	2,939
113		2			20					18-40		S		Var.	Var.	A	Penn	4,458
114		4			71					30-39		S		5,500	70	A	Penn	7,183
115	1				1					29		S		950	6		Penn	2,425
116	1	1		1						36		S		8,050	40		Penn	8,712
117										36		S		1,700				
118			R		75					39		S		7,170	18		Penn	7,388
119	1		1	1						33		S		1,700				
120			2		116					39		S		1,600			Arbuckle	3,816
121		7			390					23		S		850-1,100				
122	10				231					40		S		9,015	25		Penn	12,139
123	1				1					40		S		7,732	40		Penn	8,104
124	4				4					22		S		7,900	50		Penn	11,575
125	1				1					35		S		3,600-6,700	Var.		Penn	9,118
126	16				16					26		S-L		300-4,845	Var.		Simpson	8,150
127			4		132													
128					1					38		S		2,840-3,100	35	A	Arbuckle	5,045
129	2	2			2					39		L		4,768	90		Arbuckle	4,866
130	37	37			37					36		S		2,686	20	A	Arbuckle	2,955
131					18					36		S		2,000	22	A	Penn	4,700

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTHWESTERN OKLAHOMA

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl.	
				AREA PROVED ACRES	THOUSAND BARRELS TO END OF 1949	THOUSAND BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU. FT. TO END OF 1949	MILLION CU. FT. DURING 1949		TO END OF 1949	DURING 1949
132	Sholem Alechem (West)	Bodcaw, Penn	1949	100	50	50						
133	Velma	Pontotoc, Bodcaw Deese, Dutrick Hills, Penn, Hunton, Simpson, Ord	1947	11,000	40,534	9,669						
134	Velma (Northeast) "A"	Penn Sd	1947	10	6	3						
135	Velma (West)	Bodcaw, Deese, Dutrick Hills, Penn	1946	400	2,564	486						
136	Wholsey	Pontotoc, Glenn, Penn	1922	170	x	75						
137	Johnson-Cooper	Consol. w/Marlow N.W.										
138	Murray	Penn Sd	1949	40	4	4						
139	Payne Tillman	Consol. w/Cruce										
140	Hart (Southwest)	Simpson, Ord	1945	40	7	0						
141	Fredrick	Canyon, Strawn, Penn	1937	300	73	5						
142	Fredrick (South)	Canyon, Penn	1945	40	2	2						
143	Fredrick (West)	Canyon, Viola, Penn, Arbuckle, Ord	1937	300	1,949	64						
144	Red River (ed Basin)	Cisco, Penn	1920	500	x	59						
145	Sentinel (West)	Granite Wash, Penn	1943	160	165	43						
146	Aggregate for district of pools marked x				51,992							
147	Total Southwestern Oklahoma				819,516	53,342						

TABLE 2 - SUMMARY OF DRILLING OPERATIONS IN SOUTHEASTERN & SOUTHWESTERN OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC. SURVEY	TWP. LAT.	RGE. LONG.	TOTAL DEPTH FT. OR METERS	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL U.S. BBL.	GAS MILLIONS CU. FT.	CONDENSATE U.S. BBL.	CHOKE FRACTIONS OF AN INCH	PRESSURE LB. PER SQ. IN. CASING	PRESSURE LB. PER SQ. IN. TUBING	REMARKS
1	Carter	15	5 S	1 E	6,738		Arbuckle	McCasland	F 48			1"	1,200	1,100	Disc. E. Brock
2	Carter	31	2 S	3 E	11,953		Penn	Shell	F 119			1/2"	600	150	Disc. N. Healdton
3	Cotton	16	5 S	12 W	1,787		Permian Sd	Bova, et al	F 70			-			Disc. W. Rabbit Cr.
4	Garvin	36	3 N	3 W	7,430		Penn	Davon	F 115	2,800		1/2"	2,400	900	Disc. S. Panther Cr.
5	Garvin	14	4 N	1 W	4,716		Penn	Smiley, et al	F 77			14/64			Disc. S.W. Pauls
6	Garvin	1	1 N	1 W	4,664		Penn	Stanolind	F 60			1/8"			Disc. N.E. Brady
7	Garvin	11	1 N	2 W	997		Bromide Sd	Tidewater	F 30			-			Disc. S.E. Robberson
8	Grady	33	3 N	7 W	9,300		Penn	Caraway	F 15			-			Disc. N.E. Marlow
9	Jackson	23	1 N	25 W	9,092		Arbuckle	California	Dry			-			Dry
10	Love	32	6 S	2 E	7,147		Penn	California	F 117			15/32	900	150	Disc. Greenville
11	Love	30	7 S	3 E	10,262		Sylvan	California	Dry			-			Dry
12	McClain	29	5 N	4 W	11,760		Simpson	Cities Service	F 80			1/2"			Disc. E. Bradley
13	Pontotoc	9	4 N	5 E	3,361		Arbuckle	McBride, Inc.	F 115			1/4"			Disc. S. E. Ada
14	Stephens	3	2 S	6 W	4,863		Arbuckle	Kingery, et al	F 85			1/4"			Disc. N.E. Palacine
15	Stephens	16	2 S	6 W	2,893		Penn	Jackson	F 52			-			Disc. S.E. Palacine
16	Stephens	21	1 S	4 W	6,509		Penn	Davon	F 71			1"			Disc. W. Sholem Alechem

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[d] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[e]	CHARACTER OF OIL[f]		PRODUCING FORMATION						DEEPEST ZONE TESTED[g] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[h]	POROSITY PER CENT[i]	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT.	STRUCTURE[k]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT														
132	13	13			13					34		S		2,900-3,538	Var.	A	Pen	6,005
133		9		207	272					21-35		S-L		Var.	Var.	A F	Simpson	9,180
134	1				1					32		S		5,930	15		Pen	7,507
135	43	2			43					35		S-L		2,300-4,000	Var.	A F	Pen	9,149
136					18					32		S		1,700	Var.		Arbuckle	4,505
137										24		S-L		2,675	50		Pen	2,815
138	2	2			2													
139										36		S		4,568	16		Simpson	4,670
140	1		Abd.		Abd.					39		L-S		5,000	15		Arbuckle	5,169
141	3				3					39		L		2,970	80		Arbuckle	5,428
142	2				2					35		L		3,100-5,115	Var.		Arbuckle	5,315
143	25	4			15													
144										39		S		1,500	80		Arbuckle	2,616
145	6				6					40		Ga		5,600			Arbuckle	9,971
146																		
147		1,205	13	1,114	10,376													

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
1	*Lincoln*											
2	Agra	Wilcox, Ord			498,379	0						
3	Agra (Northwest)	Red Fork, Pen										
4		Wilcox, Ord	1949	320	598	598						
5	Agra (West)	Cleveland, Pen	1927	390	150,407	22,912						
6	Avery	Prue, Pen	1939	120	25,892	2,265						
7		Prue, Pen										
8		Skinner, Pen										
9	Chandler	Red Fork, * Pen	1924	1,255	13,663,060	184,860						
10		Viola, Ord										
11		Wilcox, Ord										
12	Chandler (East)	Prue, Pen	1949	80	6,148	6,148						
13	Davenport	Cleveland, Pen										
14		Prue, * Pen	1924	2,570	13,898,502	219,903						
15	Davenport (North)	Prue, Pen	1941	100	70,673	0						
16	Davenport (South)	Bartlesville, Pen	1926	960	2,009,673	760,671						
17	Davenport (Southeast)	Prue, Pen	1948		65,386	60,935						
18	Davenport (West)	Prue, Pen	1940		480,045	73,560						
19	Grossman	Cleveland, Pen	1934	200	630,524	53,863						
20	Happy Valley	Bartlesville, Pen	1949	480	412,129	412,129						
21	Hoyt	Skinner (gas) Pen										
22		1st Wilcox, Ord	1935	265	1,636,083	89,863						
23	Kendrick	Peru, Pen	1940	60	77,853	2,677						
24	Kendrick (East)	Bartlesville, Pen	1946	40	8,813	1,729						
25	Laffoon	Hunton (gas) Sil										
26		Wilcox, Ord	1932	470	3,270,989	161,349						
27	Lincreek	Wilcox, Ord	1932	300	283,465	4,745						
28	McCloud (North)	Wilcox, Ord	1943	160	153,096	8,344						
29	Meeker (South)	Wilcox, Ord	1943	80	40,713	4,495						
30	Meeker (Southeast)	Springer, Pen	1948	40	4,340	2,504						
31	Midlothian (Northeast)	Prue, Pen	1948		23,537	22,803						
32	Parkland (East)	Prue, Pen	1945	160	75,638	15,115						
33	Payson	L. Skinner, Pen	1940	40	33,733	2,648						
34	Peck	Viola, Ord										
35		Wilcox, Ord	1926	160	835,390	40,009						
36	Peck (South)	Prue, Pen	1947	10	1,213	310						
37	Perkins	Hunton, Sil	1940	150	428,293	22,353						
38	Perkins (South)	Hunton, Sil	1947	40	49,029	9,421						
39	Robinson Creek	Hunton, Sil										
40		Wilcox, Ord	1946	160	183,238	24,364						
41	Sac & Fox	Prue, Pen	1924-37	1,830	4,133,239	66,920						
42		Prue, Pen										
43	Shellyville	Hunton, Sil	1925	480	2,019,864	39,878						
44		Wilcox, Ord										
45	Sparks (South)	Prue, Pen	1945	80	144,617	82,732						
46	Sparr	Red Fork, Pen										
47		Skinner, Pen	1937	150	967,785	36,403						
48		Wilcox, Ord										
49	Sparr (East)	L. Skinner, * Pen	1945	280	257,926	53,242						
50		Simpson, Ord	1942	40								
51		Prue, Pen										
52	Stroud	Skinner, Pen	1923	590	10,706,081	186,830						
53		Bartlesville, Pen										
54		Wilcox, Ord										
55	Tryon (Northwest)	Red Fork, Pen	1949	160	19,044	19,044						
56	Warwick (East)	Cleveland (gas) Pen										
57		Prue, Pen	1944	200	39,999	8,667						
58	Warwick (Southeast)	Cleveland, Pen	1944	200	174,681	8,334						
59	Wellston (North)	1st Wilcox, Ord										
60		2nd Wilcox, Ord	1936	300	1,529,398	2,866						
61		Prue, Pen										
62	Wilzetta	Hunton, * Sil	1934	900	2,664,834	141,623						
63		Simpson, * Ord										
64		Prue, Pen										
65		Red Fork, Pen	1936-42	130	741,360	42,230						
66	Wilzetta (South)	Hunton, Sil										
67		Viola, Ord										
68	Wren (South)	Bartlesville, Pen	1945	40	12,624	1,959						
69	Miscellaneous	Various	Various		228,321	48,919						
70	*Payne*											
71	Blackburn (East)	Bartlesville, Pen	1939	50	x	6,205						
72	Casey	Prue, Pen	1921	20	108,332	2,341						
73		Layton, Pen										
74		Cleveland, * Pen										
75	Cleveland	Cowan, Pen	1904	4,255	41,048,237	104,755						
76		Skinner, Pen										
77		Bartlesville, * Pen										
78		Wilcox, Ord										
79		Cleveland, Pen										
80		Peru (gas) Pen										
81	Hallett	Skinner, * Pen	1922	1,655	x	33,580						
82		Bartlesville, Pen										
83		Wilcox, Ord										
84		Skinner, Pen										
85		Bartlesville, * Pen										
86	Jennings	Tonkawa, Pen	1916	1,375	4,982,393	50,370						

TABLE I - CHARLES S. LARKEY *

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED				INITIAL	AVG.-/END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. NET	STRUCTURE[l]	NAME	DEPTH OF HOLE, FT
1	Abd.				1							S	P	3,802				
2												S	P	4,251		A	2nd Wilcox	4,422
3	8	1	0		1							S	P	3,168	55	D F	2nd Wilcox	4,618
4	13	1	1		6					38		S	P	2,820			Wilcox	3,753
5	3				3					44		S	P	3,950	40			
6												S	P	4,260				
7										38-43		S	P	4,325	20		2nd Wilcox	5,050
8	61				61							L	P	4,950	30			
9												S	P	5,025				
10										41		S	P	3,861	14		Prue	
11	2	2			2							S	P	2,600				
12										43		S	P	3,350		M L		
13					140					41		S	P	3,535	13		Viola	4,587
14	Abd.		2		0					50		S	P	3,400				4,017
15	89	16			77					43		S	P	3,111	13			
16	14	11			14					46		S	P	3,460				
17		3			26					48		S	P	3,050		M	Wilcox	5,002
18	14				14					41		S	P	3,850	25	A	Bartlesville	
19	28	28			28							S	P	4,383	10			
20										40		S	P	5,050		A	Wilcox	5,147
21		4			13					46		S	P	3,500	80		Wilcox	4,655
22	3		1		2					35		S	P	3,670	15		Wilcox	4,366
23	1				1							L	P	4,000				
24										21		S	P	4,225			Wilcox	
25	14				14					46		S	P	3,770			Wilcox	
26	6				6					37		S	P	5,635	6		Wilcox	5,638
27	4		1		3									5,560x			Wilcox	
28					1					38		S	P	4,939	8	A	Hunton	5,609
29	1				1					38		S	P	3,187	10		2nd Wilcox	5,296
30	4	2			4					40		S	P	3,500	38		Prue	3,626
31	8				6					46		S	P	4,220			Viola	
32	1				1					35		S	P	4,100				
33												L	P	4,160				
34	6				6					23		S	P	2,924	8		Prue	2,932
35	1				1					34		S	P	4,490			Wilcox	4,765
36					2					43		L	P	4,505			Wilcox	4,782
37					2							L	P	4,275	40			
38												L	P	4,510	7		Wilcox	4,613
39					3					25		S	P	2,975				
40			6		103					46		S	P	3,100	40			
41												S	P	4,025	35		Wilcox	
42		4	1		17					41		L	P					
43												S	P	3,640	15		2nd Wilcox	5,002
44	4	2	1		4							S	P	3,950				
45					8					46		S	P	4,030	18		2nd Wilcox	
46												S	P	4,550		M C		
47					8					41		S	P	3,930			Wilcox	
48	8											D	P	4,545	8	A		
49	1											S	P	2,490	6			
50					39				G	41		S	P	2,555	30	D	Wilcox	4,530
51												S	P	3,270	50			
52												S	P	4,220				
53										39		S	P	4,130		A	Bartlesville	4,233
54	4	4			4							S	P	3,364				
55										42		S	P	4,007	36		2nd Wilcox	5,105
56	3				3					55		S	P	3,450	23		2nd Wilcox	5,250
57	10		1		7							S	P	5,050	12			
58										40		S	P	5,100		A F	2nd Wilcox	5,100
59					1							S	P	3,346				
60										40		L	P	4,260		A F	2nd Wilcox	
61		3	2		29							D	P	4,450				
62												S	P	3,313				
63										35		S	P	3,803		A F	2nd Wilcox	4,589
64	6				3							L	P	4,339				
65												L	P	4,473				
66										37		S	P	4,852			2nd Wilcox	5,764
67	1				1													
68		5	1		19													
69					5							S	P	2,625	6			
70					2							S	P	2,680	10		Chattanooga	3,328
71												S	P	1,300	30			
72												S	P	1,700	20			
73					140					36		L	P	2,090	20			
74												S	P	2,180				
75												S	P	2,400	110			
76												S	P	2,710				
77												S	P	2,140	25			
78												S	P	2,335	45			
79		3	4		28				G	38		S	P	2,565	35			
80												S	P	2,688	12			
81												S	P	2,680	10			
82												S	P	2,500	55			
83												S	P	2,685	15			
84		6			45					37		S	P	2,800	50		Wilcox	

* Head Valuation Dept., Pet. Engr., Sinclair Prairie Oil Co., Box 521, Tulsa, Okla. Member AIME.

TABLE I – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION (Thousands of Bbl)	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
85		Burgess, Pen										
86		Mississippi, Miss										
87		Wilcox, * Ord										
88		Cleveland, * Pen										
89		Skinner, (gas) Pen										
90	Keystone	Bartlesville, * Pen	1919	5,565	3,439,913	184,905						
91		Mississippi, Miss										
92		Wilcox, Ord										
93		Layton, Pen										
94		Cleveland, Pen										
95	Lauderdale	Skinner, Pen	1915	4,300	14,949,076	182,500						
96		Bartlesville, * Pen										
97		Wilcox, Ord										
98		Turkey Mt., * Cam										
99		Layton, Pen										
100		Cleveland, Pen										
101		Osage, Pen										
102	Maramec	Prue, Pen	1920	1,960	4,132,960	211,335						
103		Skinner, Pen										
104		Bartlesville, *Pen										
105		Burgess, Pen										
106		Wilcox, Ord										
107	Maramec (East)	Tucker, Pen	1948	80	6,520	5,314						
108	Maramec (North)	Prue, Pen	1945	30	35,695	6,762						
109		Cleveland (gas), Pen										
110	Maston	Osage (gas), Pen	1924	290	x	5,475						
111		Simpson, Ord										
112	Pasture (East)	Misener, Miss	1941	10	8,731	0						
113		Skinner, Pen										
114		Bartlesville, * Pen										
115	Ralston	Burgess, * Pen	1909	205	2,272	2,272						
116		Simpson, Ord										
117		Wilcox, Ord										
118	Skedee	Prue, * Pen										
119		Skinner, Pen	1926	160	288,203	7,791						
120	Terlton	Various, Pen & Ord	1912	980	1,015,111	14,965						
121	Terlton (North)	Various, Pen & Ord	1917	2,010	3,489,636	31,215						
122		Tonkawa (gas) Pen										
123	Watchorn	Layton, Pen	1917-1922	530	7,924,785	32,876						
124		Wilcox, Ord										
125		Hoover (gas), Pen										
126	Watchorn (East)	Bartlesville, Pen	1942	830	6,012,317	539,714						
127		Wilcox, Ord										
128	Watchorn (North)	Bartlesville, Pen	1945	10	4,107	0						
129	Watchorn (Northeast)	Layton, Pen	1945	20	7,181	2,125						
130	Miscellaneous Payne	Various	Various		x	730						
131		Osage-Layton, Pen										
132	Broyles	Misener, Pen	1918	340	x	35,040						
133		Bartlesville (gas) Pen										
134	Broyles (East)	Osage, Pen	1940	110	44,070	0						
135	Council Creek	Bartlesville, Pen	1945	10	754	0						
136	Council Creek (Southeast)	Cleveland, Pen										
137		Bartlesville, * Pen	1947	80	88,408	36,091						
138		Layton, Pen										
139	Coyle	Bartlesville, Pen	1938	1,340	9,745,558	229,406						
140		Wilcox, Ord										
141	Coyle (North)	Hunton, Sil	1942	80	62,871	93						
142		Cleveland, Pen										
143		Red Fork, Pen										
144	Garr	Misener, Miss	1920	1,155	3,216,828	68,985						
145		Wilcox, Ord										
146	Glencoe	Misener, Miss	1943	80	21,433	0						
147	Goodnight (Northeast)	Red Fork, Pen	1947	40	25,854	14,746						
148	High Prairie (Northeast)	Bartlesville, Pen	1949	60	11,880	11,880						
149		Skinner, Pen										
150		Red Fork, Pen										
151	Ingalls	Bartlesville, * Pen	1914	1,110	6,778,122	61,320						
152		Mississippi, Pen										
153		Misener, * Pen										
154		Wilcox, * Ord										
155		Red Fork (gas), Pen										
156	Ingalls (East)	Hunton, Sil	1943	130	523,348	16,033						
157		Misener, * Miss										
158	Ingalls (Northeast)	Bartlesville, Pen	1925	480	1,765,132	10,615						
159		Misener, Miss										
160	Ingalls (Northwest)	2nd Wilcox, Ord	1944	120	84,646	6,826						
161	Ingalls (Southeast)	Prue, Pen	1948	40	2,620	1,669						
162	Long Branch	Perry, Pen	1926	60	62,024	1,909						
163		Prue, Pen										
164	March	Skinner (gas) Pen	1922	1,410	x	57,305						
165		Bartlesville, Pen										
166	March (North)	Wilcox, Ord	1926	460	850,311	307,695						
167	Markham	Burgess, Pen										
168		Mississippi, Miss	1928	280	80,079	1,775						

TABLE 1 - CONTINUED CHARLES S. LARKEY

LINE NUMBER	NUMBER OF WELLS[e] COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	WELLS PRODUCING[f] DEC. 1949	RESERVOIR PRESSURE LB PER SQ INCH INITIAL	RESERVOIR PRESSURE LB PER SQ INCH AVG./END 1949	SECONDARY RECOVERY[g]	CHARACTER OF OIL[h] GRAVITY A.P.I.	CHARACTER OF OIL[h] SULPHUR PER CENT	PRODUCING FORMATION CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[m]	DEEPEST ZONE TESTED[n] TO END OF 1949 NAME	DEEPEST ZONE TESTED[n] TO END OF 1949 DEPTH OF HOLE, FT.
85										S	P	3,000	15			
86										L	P	3,890				
87										S	P	3,260				
88										S	P	1,100	45			
89										S	P	1,800	20			
90		17	4	149			W	37		S	P	1,950			Turkey Mt.	
91										L	P	1,970	55			
92										S	P	2,430	10			
93										S	P	1,400				
94										S	P	1,700	50			
95		1	22	115				37		S	P	2,300	25	D	Turkey Mt.	
96										S	P	2,400	25			
97										S	P	2,522	80			
98										S	P	3,000	25			
99										S	P	2,070	50			
100										S	P	2,400	60			
101										L	P	2,650	70			
102		15	6	106				37		S	P	2,750	60		Wilcox	
103										S	P	2,900	80			
104										S	P	3,080	50			
105										S	P	3,200	40			
106										S	P					
107	2	1		2						S	P	3,003	21			
108	3			3						S	P	2,727	18		Pine	2,752
109										S	P	2,340	25			
110				5				39		L	P	2,900	50		Wilcox	
111										S	P	3,700	75			
112				Abd.				42		S	P	3,361	4			
113										S	P	3,000	45			
114										S	P	3,200	20			
115		1		1				39		S	P	3,350	60	A	Wilcox	3,801
116										S	P	3,550				
117										S	P	3,364	66			
118										S	P	2,610				3,356
119	2			2				40		S	P	2,670			Wilcox	3,182
120	7			7				38				1,440				
121				46						S	P	2,475	40			
122								41		S	P	2,675	30		Arbuckle	
123			1	12						S	P	4,105	120			
124										S	P	1,700	40			
125								43		S	P	3,500		A F	Wilcox	
126			1	26						S	P	3,880	31			
127								37		S	P	3,580	21		Hartlesville	3,601
128				Abd.						S	P	2,700	8			2,732
129				1												
130																
131										S	P	1,990	6			
132				20				43		S	P	3,750	16	A	Hartlesville	
133										S	P		30			
134								36		L	P	2,900				4,429
135				Abd.						S	P	3,731	22			
136				Abd.						S	P	3,309	16			
137	6	2		6				38		S	P	3,840	10		2nd Wilcox	
138										S	P	3,450	30			
139				30				37		S	P	4,350	20		Wilcox	
140										S	P					
141	2			1				35		L	P	4,750	9		2nd Wilcox	
142										S	P	2,750				
143										S	P	1,200				
144		1	1	29				38		S	P	5,575			Wilcox	
145										S	P	3,700				
146				Abd.				40		S	P	4,029	19		Wilcox	4,121
147	2			2				37		S	P	4,229	29		2nd Wilcox	4,528
148	5	5		5						S	P	3,950	13		Arbuckle	4,617
149										S	P	3,350				
150								41		S	P	3,430				
151				24						L	P	3,628		A	Granite	4,150
152										S	P	3,680				
153										S	P	3,750				
154										S	P	3,800				
155								44		S	P	3,280	16			
156	6			4						L	P	3,797		A	Wilcox	3,748
157								41		S	P	3,850	6	A	Wilcox	
158				7						S	P	3,301	64	A	Wilcox	
159								45		S	P	3,730				
160	2	1		2						S	P	4,033	8		2nd Wilcox	4,041
161	1			1				42		S	P	3,958	6		2nd Wilcox	4,237
162		2		2						S	P	3,066	13		Sampson	4,092
163								38		S	P	2,760	95			
164		1		24						S	P	2,980	30	A	Wilcox	
165								43		S	P	3,130	50			
166		31		40						S	P	3,800			Wilcox	
167				4						L	P	3,266	13		2nd Wilcox	3,478
168																

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS		AREA PROVED ACRES	MILLION CU FT[c]				
					TO END OF 1949	DURING 1949		TO END OF 1949	DURING 1949		TO END OF 1949	DURING 1949
169		Prue, Pen										
170	Markham (West)	Skinner (gas), Pen	1943	40	60,108	3,469						
171		Wilcox, Ord										
172		Bartlesville, Pen										
173	Mehan	Viola (gas), Ord	1925	670	2,344,431	734						
174		1st Wilcox, Ord										
175		2nd Wilcox, Ord										
176		Layton, Pen										
177	Mehan (Northeast)	Stray Bartlesville, Pen	1941	330	1,101,139	52,735						
178		1st Wilcox, Ord										
179		2nd Wilcox, Ord										
180	Mehan (Northwest)	Bartlesville, Pen	1946	160	152,360	65,447						
181	Mehan (South)	Wilcox, Ord	1948	80	12,271	9,750						
182	Mount Hope (Northwest)	Red Fork, Pen	1948	240	75,587	75,587						
183	New Cushing (Redrilled)	Prue, Pen										
184		Misener, Mis	1946	185	45,775	9,351						
185		Prue, * Pen										
186	Norfolk	1st Wilcox, Ord	1918	800	x	81,760						
187		2nd Wilcox, Ord										
188		Prue, Pen										
189	Norfolk (West)	Bartlesville, Pen	1929	960	x	77,745						
190		Wilcox, Ord										
191	Orlando	Misener, Mis	1929	210	1,276,212	28,399						
192	Orlando (East)	Misener, Mis	1941	80	295,442	13,711						
193	Prairie View	Skinner, Pen	1949	40	7,306	7,306						
194	Ramsey	Hunton, Sil										
195		1st Wilcox, Ord	1938	500	13,496,462	737,960						
196	Ramsey (Northeast)	Skinner, Pen	1949	80	29,899	29,899						
197	Ramsey (Southeast)	L. Skinner, Pen	1948	40	78,249	77,416						
198		Viola, Ord										
199	Ripley	1st Wilcox, Ord	1923	175	x	3,285						
200		2nd Wilcox, Ord										
201	Ripley (North)	2nd Wilcox, Ord	1923	165	2,348,251	11,370						
202	Sparn (Northeast)	Red Fork, Pen	1948	160	16,381	8,216						
203	Stillwater	Wilcox, Ord	1935	130	559,188	1,800						
204	Stillwater (West)	Hunton, Sil	1940	270	514,250	57,655						
205	West Point (South)	Bartlesville, Pen	1945	10	16,049	6,346						
206		Prue, Pen										
207		Skinner, Pen										
208	Yale-Quay	Osage, Pen	1914	4,095	27,537,318	805,920						
209		Bartlesville, Pen										
210		Wilcox, Ord										
211	Yale (Southwest)	Perry, Pen	1949	80	12,066	12,066						
212	Yale (West)	Bartlesville, Pen										
213		2nd Wilcox, Ord	1944	340	281,131	49,017						
214	Miscellaneous	Various	Various		x	9,880						
215												
216	Aggregate for district for pools marked x				5,858,253							
217												
218	Total Central Oklahoma				239,176,661	7,439,382						

TABLE 1 – CONTINUED CHARLES S. LARKEY

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949	RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED		INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY, PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[n]	NAME	DEPTH OF HOLE, FT.
169				2				42		S	P	2,819			2nd Wilcox	3,586
170										S	P	3,584	2			
171				1				43		S	P	3,740	34		2nd Wilcox	4,748
172										L	P	4,169		A		
173										S	P	4,200				
174										S	P	4,230				
175				15				47		S	P	2,307	33		2nd Wilcox	4,196
176										S	P	3,825				
177										S	P	4,065	11			
178										S	P	4,100	25			
179				10				47		S	P	3,950	15	A		4,446
180	10	5		3						S	P	4,380	6		Tyner	4,258
181	3	1		9				39		S	P	3,738	18			
182		9								S	P	3,000				
183				1				38		S	P	3,700				
184										S	P	2,900			2nd Wilcox	
185								38		S	P	3,470				
186		10	1	30						S	P	3,480				
187										S	P	2,800			2nd Wilcox	
188				47				38		S	P					
189		24								S	P	3,425			Wilcox	5,002
190				5				41		S	P					
191				3				41		S	P	4,720	13		Skinner	4,962
192	3			2				42		S	P	4,911	12			
193										L	P	4,580	40		Wilcox	
194				32				42		S	20	4,760	45	D F	Bartlesville	4,405
195	40			5				36		S	P	4,366	11		Red Fork	4,356
196		5		4						S	P	4,321	17			
197	4	3								L	P	4,020			2nd Wilcox	4,290
198				2				43		S	P	4,070				
199										S	P	4,110			2nd Wilcox	
200				2				42		S	P	4,190				4,614
201				4						S	P	3,945	35		Arbuckle	
202	4			1				40		S	P	4,300	6	A	2nd Wilcox	4,656
203				5				40		L	P	4,520	31			4,008
204	9			1				33		S	P	3,569	6			
205	1									S	P	2,700				
206										S	P	3,050				
207							G	38		L	P					
208		7	1	187						S	P					
209										S	P	3,500				
210								37		S	P	2,815	10		2nd Wilcox	3,737
211		4		4						S	P					
212				13						S	P	3,579			2nd Wilcox	
213																
214																
215																
216																
217																
218	1,973															

TABLE 2 - SUMMARY OF DRILLING OPERATIONS IN CENTRAL OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC. SURVEY	TWP. LAT.	RGE. LONG.	TOTAL DEPTH, FT. OR METERS	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL, U.S. BBL.	GAS, MILLIONS CU. FT.	CONDENSATE U.S. BBL.	CHOKE, FRACTIONS OF AN INCH	PRESSURE, Lb. PER SQ. IN. CASING	TUBING	REMARKS
1	Lincoln	25	17 N	5 E	3,430	Bartlesville, Pen	Bartlesville, Pen	Foster Drilling Co	45			Pump			D D to 3,447
2	Lincoln	35	14 N	6 E	4,205	Hunton, Dev	1st Wilcox, Ord	Regent Oil Co		8					
3	Lincoln	10	14 N	4 E	3,877	Prue, Pen	Prue, Pen	Dick Wegener	60			Pump			
4	Lincoln	28	17 N	4 E	4,375	Bartlesville, Pen	1st Wilcox, Ord	Fordee-Rhoades & Texinia Corp	12			Pump			
5	Lincoln	19	14 N	6 E	3,421	Prue, Pen	Prue, Pen	Creekmore-Rooney	35			Pump			
6	Lincoln	26	14 N	3 E	5,288	Prue, Pen	Prue, Pen	F A Gillespie & Sons	17			Flow			
7	Lincoln	26	14 N	3 E	4,124	Oswego, Pen	Oswego, Pen	Falcon Seaboard et al	52			Flow			
8	Lincoln	10	16 N	3 E	4,282	Red Fork, Pen	Bartlesville, Pen	Ray P. Diehl	75			Flow			
9	Lincoln	21	17 N	5 E	4,090	Bartlesville, Pen	1st Wilcox, Ord	Sterling Oil		1			1,300 HP		
10	Lincoln	6	15 N	6 E	4,259	Hunton, Dev	Wilcox, Ord	Hubbel & Webb	20			Pump			
11	Pawnee	24	20 N	9 E	2,324	Burgess, Pen	Burgess, Pen	Toklan Prod Co	164			Flow			
12	Payne	36	19 N	3 E	3,767	Red Fork, Pen	Red Fork, Pen	The Texas Co	118			Flow	150		
13	Payne	36	9 N	3 E	3,754	Red Fork, Pen	Red Fork, Pen	The Texas Co	112			Flow			
14	Payne	26	19 N	5 E	2,816	Peru, Pen	Peru, Pen	Thos. N. Berry Co	20			Pump			
15	Payne	21	19 N	1 W	4,962	Skinner, Pen	Skinner, Pen	C. P. Quinlan	25			Flow			
16	Payne	5	18 N	2 E	4,414	Skinner, Pen	Skinner, Pen	Eddie Fisher	50			Pump			Jet shot
17	Payne	10	18 N	4 E	3,144	Peru, Pen	Peru, Pen	Thos. N. Berry	24			Pump			
18	Payne	15	18 N	7 E	3,980	Bartlesville, Pen	Bartlesville, Pen	R. C. Jones & Co	80			Flow	425		Extension

	IN PROVEN FIELDS	WILDCATS
Number of wells drilling Dec. 31, 1949	20	4
Number of wells completed during 1949	309	106
Number of gas wells completed during 1949	5	2
Number of dry holes completed during 1949	75	86

NORTHERN OKLAHOMA

By GEORGE R. ELLIOTT,* Member AIME

CIMARRON COUNTY

Southeast Keyes is a discovery in the Keyes Sand, Pennsylvanian. The discovery well was Bay Petroleum's No. 1 Parkes completed in April flowing 52 B/D, 42° gravity oil. The well averaged 75 B/D in December.

GARFIELD COUNTY

Another Wilcox discovery opened a new field, Northwest Hunter. A. G. Oliphant's Hoover No. 1 was completed in November flowing 256 B/D, 44° gravity oil.

GRANT COUNTY

Two pool discoveries were made during the year: Rich Valley and East Renfrow. The Rich Valley discovery well was Vierson-Cochran's Vollmer No. 1, completed in February flowing 190 B/D, 41° gravity, from the Wilcox. In December, this pool was producing 533 B/D from six wells. East Renfrow is another Wilcox discovery; Cities Service's Pratt 1 was completed in June flowing 162 B/D, 50.5° gravity. In December, the Pool was producing 182 B/D from two wells.

KAY COUNTY

Northeast Uncas Bartlesville sand gas pool was discovered by Dave Morgan's Cales No. 1 in December, with a potential of 5,500 Mcf and 10 B/D.

LOGAN COUNTY

North Lovell is a new Tonkawa Sand Pool. Discovery well was James Snowden's Fry 1-A, completed in March flowing 51 B/D, 42.6° gravity. In December, the pool was producing 120 B/D from five wells.

MAJOR COUNTY

The Manning Sand, Pennsylvanian, was actively developed. The producing wells in Ringwood were increased from 10 to 26 and West Ringwood was added with two wells. These two pools in December were producing 1,391 B/D.

NOBLE COUNTY

The South Ceres Bartlesville Sand stringer was extended to six miles increasing the wells from 27 to 49, producing 1,216 B/D in December. Fourdee was actively developed, increasing the wells from 51 to 84, and producing 2,116 B/D in December.

* PET. ENGR., PROD. DEPT., PHILLIPS PET. CO., BARTLESVILLE, OKLA.

MANUSCRIPT RECEIVED AT THE OFFICE OF THE INSTITUTE APRIL, 1950.

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR NORTHERN OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
	Canadian											
1	Piedmont, North (was Simpson)	Bartlesville; Pen	1946		5,757	2,487						
	Cimarron											
2	Keyes	Granite Wash	1945		24,112	10,428						
3	Keyes, Southeast	Keyes; Pen	1949		11,067	11,067						
	Garfield											
4	Barnes	Tonkawa, Layton; Pen	1918	320	x	5,068						
5	Barnes, North	2nd Wilcox; Ord	1945	80	81,088	2,993						
6	Brown	Wilcox; Ord	1930	85	855,750	70,595						
7	Brown, East	Wilcox; Ord	1945	120	82,218	22,109						
8	Drummond		1947		18,313	6,712						
9	Enid	Miss	1940	100	138,253	7,015						
10	Garber	Various; Per, Pen, Ord	1916	4,600	59,547,873	445,966						
11	Garber, North	Various; Pen, Ord	1927	90	x	12,042						
12	Garber, Southeast				x	0						
13	Hillsdale	Wilcox; Ord	1928	20	130,946	589						
14	Hunter, Northwest	Wilcox; Ord	1949		14,990	14,990						
15	Hunter, Southwest	Wilcox; Ord	1945		393,309	63,460						
16	Kremlin, East		1945		1,125	0						
17	New Garber	Arbuckle; Ord	1945		210,809	24,913						
18	Reed				80,597	2,039						
19	Spring Valley, Southeast	Wilcox; Ord	1946	40	24,821	5,299						
20	Waukomis	Marshall; Ord	1938		35,044	Abd.						
	Grant											
21	Caldwell	Wilcox; Ord	1929		269,325	Abd.						
22	Deer Creek	Var; Pen, Mis, Ord	1922	210								
23	Lamont	Wilcox; Ord	1937	100	788,843	Abd.						
24	Nash, East	Oswego; Pen	1948		474	0						
25	Renfrow, East	Wilcox; Ord	1949	80	45,752	45,752						
26	Rich Valley	Simpson; Ord	1949	240	176,458	176,458						
27	Webb	Var; Pen, Mis, Ord	1926	120	550,514	245,034						
28	Webb, North	Wilcox; Ord	1948	120	267,265	225,175						
	Harper											
29	Howell		1930								9,165	
	Kay											
30	Banner, West		1948		5,555	1,275						
31	Blackwell	Various; Pen, Ord	1918	1,600	6,237,629	169,902						
32	Braman	Various; Pen, Ord	1924	335	4,955,779	17,932						
33	Braman, North	Various; Pen, Ord	1924	795	19,519,569	105,332						
34	Braman, Southeast	Wilcox, Arbuckle; Ord	1930	40	573,476	6,930						
35	Dilworth	Blackwell, Wilcox; Pen Ord	1917	2,355	x	314,475						
36	Dilworth, East		1947	40	7,981	2,809						
37	Garrett		1949		25,679	25,679						
38	Hubbard	Various; Pen, Ord	1924	645	9,458,371	146,804						
39	Mervine	Various; Pen	1913		x	3,631						
40	Mervine, North		1935		x	18,589						
41	Mervine, South			40	x	43,881						
42	Newkirk		1919	250	x	17,816						
43	Ponca City	Various; Pen, Mis, Ord	1917	1,445	6,954,113	73,488						
44	Ponca City, East		1948		12,537	1,115						
45	Stone				4,104	Abd.						
46	Thomas	Various; Per, Pen, Ord	1914	275	7,788,365	90,275						
47	Tonkawa	Various; Pen, Mis, Ord	1921	3,500	124,698,306	264,073						
48	Tonkawa, North	; Mis	1944		818	Abd.						
49	Uncas, Northeast	Bartlesville; Pen	1949		62	62						
50	Vernon	Various; Pen, Mis, Ord	1925	660	4,168,080	74,841						
51	Vernon, South				620	Abd.						
52	Vickery				x	Abd.						
	Kingfisher											
53	Cashion, Northwest	Hunton, Sil	1945	630	386,167	62,242						
54	Dover, Southwest	Hunton, Simpson; Sil, Ord	1949		6,784	6,784						
55	Hanley	Bartlesville; Pen	1946		1,315	Abd.						
56	Lankard	Misener; Sil	1947		862	492						
	Logan											
57	Coon Creek	2nd Wilcox; Ord	1946	1,630	5,536,849	1,527,689						
58	Coyle, South		1947		1,902	Abd.						
59	Crescent	Layton, Wilcox; Pen, Ord	1933	1,500	22,394,931	637,224						
60	Crescent, East	Layton; Pen	1944	160	129,623	17,502						
61	Crescent, South	Layton; Pen	1942	160	119,470	10,684						
62	Evansville, East	Bartlesville; Pen	1948	200	330,486	173,637						
63	Evansville, Northwest	Bartlesville; Pen	1945	300	383,138	60,136						
64	Goodnight, Southwest	Misener; Sil	1948		1,479	765						
65	Guthrie	Bartlesville, 2nd Wilcox; Pen, Ord	1941	300	1,413,986	45,024						
66	Guthrie Townsite	Tolesite, Wilcox;Ord	1942	80	337,067	28,218						
67	Hall	Layton, Tonkawa, Wilcox; Pen, Ord	1934	120	456,261	3,810						
68	Ioonium, Northwest	2nd Wilcox; Ord	1947	360	1,800,579	910,773						
69	Langston	Wilcox; Ord	1934	360	2,343,588	66,345						
70	Langston, South	Simpson; Ord	1935	80	53,035	Abd.						
71	Lovell	Tonkawa, Layton; Pen	1928	1,000	2,352,569	17,027						
72	Lovell, North	Tonkawa; Pen	1949		20,237	20,237						
73	Lovell, South	Layton; Pen	1934	760	1,389,301	89,343						

LINE NUMBER	NUMBER OF WELLS[d]			WELLS PRODUCING[f] DEC. 1949		RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION				DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[R]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED														
1	1			1							S		7,100			Wilcox	8,366
2	5			5									4,800				
3	1	1		1					42				4,800			Keyes, Pen	4,845
4				10					39		S						
5	2			2					31		S		4,838	9			
6			2	13					39		S		5,820				
7	3			3					39		S		5,983				
8	1			1													
9				3					40		L		6,200				
10			14	454					41		S L						
11			1	6					44								
12				1													
13				1					39		S		6,700				
14	1	1		1					44								
15	9			9					38		S		6,140	8			
16	1			1									5,247				
17	4			4							L		5,250				
18	1			1													
19	1			1					40		S		6,045				
20													7,260	20			
21																	
22				5									3,800				
23																	
24	1			1									3,375				
25	2	2		2							S		4,977			Simpson, Ord	4,979
26	6	6		6					41-51		L		5,800			Simpson, Ord	5,848
27				15					40				4,300				
28	8	3		8					43		S		4,700				
29	1			1													
30	2			2									4,225				
31		6		42					35				3,400				
32				19					42				2,400				
33			1	39					41								
34				4					40		S L		3,700				
35		6	2	85					40		S		3,400				
36	1			1									3,436				
37	1	1		1									4,078				
38		2		35					39				4,040				
39		1		2									3,150				
40				5									3,020				
41	4	3		4													
42			2	4					40								
43		2		38					38								
44	1			1									4,445				
45																	
46				18					41				4,250				
47			22	109					43				4,350				
48											S						
49		2		2									3,240				
50		2	2	29					40				2,400				
51																	
52																	
53	4			4					41		L		7,060	30	M U	Simpson, Ord	8,863
54	1			1					60		L		8,070				
55													8,555				
56	1			1									7,567				
57	41		1	40					38		S		5,950	21	A		
58									41		S		4,900				
59	133			131							S		6,600				
60	3			3					43		S		4,740			Wilcox	6,330
61	4			1					44		S		5,237	26			
62	9			9					40		S		5,000	30			5,922
63	5			5									5,231	12			
64	1			1													
65	27			18					46		S		5,625	20			
66											L S		5,700				
67	2			2							S						
68	4			4													
69	28	3	5	23					38		S		5,238	22			
70	13		1	10					39		S		5,100		A	Wilcox	5,190
71	16		2	14					40		L						
72	5	5		5					40		S					Tuscaloosa, Pen	4,962
73	16		1	15					44		S		4,900				

TABLE I – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR NORTHERN OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[c] MCF/BBL	CONDENSATE PRODUCTION (Thousands of Bbl)	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
74	Lowell, Southeast	Layton; Pen	1944	840	1,466,191	101,244						
75	Lowell, West	2nd Wilcox; Ord	1936		97,225	Abd.						
76	Marshall	Tonkawa, Simpson, Wilcox; Pen, Ord	1927	660	12,248,166	38,062						
77	Meridian	Wilcox; Ord	1938		187,644	Abd.						
78	Navina	Layton; Pen	1941		475	Abd.						
79	Navina, Northeast	Red Fork; Pen	1948		51,362	36,516						
80	Navina, West	Layton; Pen	1942	280	400,577	13,641						
81	Pleasant Valley	Skinner; Pen	1943	120	24,161	279						
82	Porter	Bartlesville; Pen	1948		714	Abd.						
83	Seward	Simpson; Ord	1936	80	158,368	7,714						
	Major											
84	Menu, Southeast	2nd Wilcox; Ord	1947	160	35,564	7,332						
85	Ringwood	Manning; Ord	1945		405,016	283,112						
86	Ringwood, West	Manning; Ord	1949		11,962	11,962						
	Noble											
87	Billings (Total)				26,030,380	282,178						
88	Billings (Shallow)	Var; Pen	1917		6,237,257	1,578						
89	Billings (Deep)	Wilcox; Ord	1936	480	19,793,123	280,600						
90	Billings, West	1st Wilcox; Ord	1945	160	335,336	26,280						
91	Ceres, South	Bartlesville; Pen	1947	1,000	2,152,721	784,775						
92	Ceres, Southeast (Included in Ceres, South)											
93	Ceres, Southwest (Included in Ceres, South)											
94	Fourdee	Chat; Mis	1946	3,400	1,481,309	747,313						
95	Liberty	Tonkawa, Wilcox; Pen Ord	1942	80	294,429	4,433						
96	Liberty, East	Wilcox; Ord	1942	120	358,624	6,264						
97	Longview, Northeast	Bartlesville; Pen	1947		3,019	1,128						
98	Lucien	Wilcox; Ord	1933	3,600	35,972,082	597,853						
99	Lucien, North	Wilcox; Ord	1936	440	1,703,937	58,784						
100	Lucien, Northeast	Viola, Simpson; Ord	1942	240	692,199	32,354						
101	Marathon			120	138,341	Abd.						
102	Morrison "A"	Mis	1942	40	2,099	Abd.						
103	Otoe City	Layton, Prue, Wilcox; Pen, Ord	1941	200	1,215,303	230,067						
104	Otoe City, East	Tonkawa; Pen	1933	320	795,212	49,723						
105	Otoe City, Southeast				1,063	Abd.						
106	Perry	Tonkawa; Pen	1923	60	112,481	3,782						
107	Perry, Northwest	Layton, Wilcox; Pen, Ord	1947	680	881,961	518,709						
			1943		22,413	Abd.						
108	Perry, Southeast		1934	510	5,841,854	178,068						
109	Polo	Layton, Wilcox; Pen, Ord										
110	Polo, South	Bartlesville; Pen	1945	80	61,688	4,557						
111	Polo, Southeast	2nd Wilcox; Ord	1947	280	538,282	199,787						
112	Red Rock	1st Wilcox; Ord	1945	80	42,637	2,495						
113	Sumo	Tonkawa; Pen	1925	300	1,577,491	9,708						
114	Sumo, Northeast	Misener; Sil	1943	80	129,834	8,680						
115	Sumner, West				115,964	Abd.						

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949		RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[n]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED														
74	18			16					40		S		4,800	31	A		
75																	
76	30	3		29					40		S		5,900				
77																	
78									43		S		5,760				
79	1			1					40		S		5,950				
80	6			6							S		5,700				
81	1			1							S		4,784				
82											L		6,300				
83	2			2													
84	1			1					62		S		6,669				
85	26	16		26					41		S		6,750	23			
86	2	2		2					39		S		6,740	75		Manning, Pen	6,945
87																	
88				2					41		S		4,300	43	M U		
89	75			71							S		4,434	16	A		
90	6		1	5					39		S		4,500				
91	49	6		49													
92																	
93																	
94	84	33		84					41		S		4,798	17			
95	3			2									2,600				
96	2			2							S		4,800	30			
97	1			1							S		4,370	45			
98	133			111					41		S		3,850		A F		
99	14		3	5					41		S		5,400				
100	5			5							L		5,389	10			
101														34	A		
102									42				4,350	10	A		
103	22	2	1	22					39		S		3,384	30			
104	17			13							S		2,562			Wilcox	4,669
105									41				1,803				
106	1			1					40		S		5,150				
107	26	9	1	25									3,494				
108									41				4,875				
109	37		1	25									4,678	18			
110	2			2					43				5,124	15			
111	11	3		11					46				4,584				
112	2			1					42				1,902	10			
113				2									5,050	14		Wilcox	5,250
114	3		1	2									4,509	7			
115																	

TABLE 2 - SUMMARY OF DRILLING OPERATIONS IN NORTHERN OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC.	TWP. SURVEY	TWP. LAT.	RGE. LONG.	TOTAL DEPTH, FT. OR METERS	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY: OIL, U.S. BBL.	GAS, MILLIONS CU. FT.	CONDENSATE U.S. BBL.	CHOKE, FRACTIONS OF AN INCH	PRESSURE, LB. PER SQ. IN.: CASING	TUBING	REMARKS
1	Canadian	18	11 N		8 W	11,177		Chester; Mis	Cities Service Oil Co							Dry
2	Cimarron	34	4 N		8 ECM	4,845		Keyes; Pen	Bay Petroleum Co.	52						Disc. 4-48
3	Garfield	2	24 N		5 W	6,230	Wilcox; Ord	Wilcox; Ord	A. G. Oliphant	256						
4	Grant	1	25 N		5 W	5,848	Wilcox; Ord	Marshall; Ord	Vierson-Cochran	190						Disc. 2-49
5	Grant	21	26 N		3 W	5,426	; Mis	Wilcox; Ord	Anderson-Prichard	27						Disc. 12-13
6	Grant	6	28 N		3 W	4,979	Wilcox; Ord	Wilcox; Ord	Cities Service Oil Co	162						Disc. 6-8
7	Harper	2	25 N		22 W	9,436		Artuckle; Cam-Ord	Continental Oil Co.							Dry
8	Kay	20	27 N		4 E	3,236	Bartlesville; Pen	Bartlesville; Pen	Dave Morgan	10	5.5					
9	Kingfisher	16	17 N		7 W	8,863	Simpson; Ord	Wilcox; Ord	Superior Oil Co	6						Disc. 5-17
10	Kingfisher	26	19 N		9 W	8,660		Sylvan; Ord	Atlantic Ref Co							Dry-Slight shows in pen
11	Logan	4	18 N		4 W	4,962	Tonkawa; Pen	Layton; Pen	James Snowden	51						Disc. 3-3
12	Major	34	22 N		10 W	7,853	Manning; Pen	Manning; Pen	Mazda Oil Co	100						Disc. 1-25
13	Major	30	22 N		10 W	6,898	Manning; Pen	Manning; Pen	Mazda Oil Co	82						Disc. 5-24
14	Major	12	21 N		10 W	6,945	Manning; Pen	Manning; Pen	Mazda Oil Co	44						Disc. 12-13
15	Noble	26	22 N		2 W	5,146	Wilcox; Ord	Wilcox; Ord	Mazda Oil Co	192						Disc. 2-22
16	Noble	23	22 N		2 W	5,155	; Mis	Wilcox; Ord	Anderson-Prichard	10						Disc. 3-31

SEMINOLE AREA

By JAMES A. BERMINGHAM, JR., * Member AIME

An active drilling campaign of both exploratory and extension wells was again evident in the Seminole Area during 1949. The figures were only slightly less favorable than those of 1948, which was the State's most active year in searching for new oil. There were 576 wells completed; 295 were producing oil wells, 30 were gas wells, and 251 dry holes. The results show that 51.2 per cent of the wells drilled were completed as oil wells, and 5.2 per cent were completed as gas wells. Of the 576 wells drilled 80 were wild cats, the remainder were extensions to old fields.

The Seminole Area includes all of Hughes County, Pottawatomie County, Seminole County, and some of the Southwestern portion of Okfuskee County. That part of Okfuskee County which is included has been redefined this year, resulting in a slightly greater area, as shown in the plat Fig. 1.

Twenty new fields were discovered this year, and a brief history of each of them follows.

HUGHES COUNTY

Atwood North Field was discovered by Coronado Oil Co. by drilling their Stephenson No. 1 NE-NE-NW Section 15-6N-9E. Its initial oil production was 32 B/D pumped from the Booch Sand of Pensylvanian Age. Total depth of the discovery well is 2,819 ft. Drilled in October, 1949, by the year's end the pool had two producing wells averaging 29 and 15 B/D. They have a cumulative production of 4,105 bbl. No dry holes have been drilled. Four additional locations have been started.

The Benjamin Field was discovered in April, 1949 at J. A. Chapman's McKan No. 1 NE-NE-NE Section 14-8N-8E. The well was drilled to a total depth of 3,314 ft. in the Cromwell Sand of Pennsylvanian Age. The producing zone is approximately 18 ft. thick. Upon completion the well flowed 20 B/D through a 3/4 in. choke. An enthusiastic campaign followed. On December 31 the field had 13 wells with a total production of 650 B/D, and had reached a cumulative production of 40,350 bbl. Present estimates indicate the field will cover an area of 320 acres.

Hill Top North Field was opened by the Pure Oil Co. at their Derrick No. 1, NE-NE-NW, Section 32-6N-11E, Hughes County. The discovery well was drilled to a total depth of 6,130 ft. in the Second Wilcox Sand of Ordovician Age. It is mainly a gas well, having an initial open-flow test of 2.6 MMcf, with a casing pressure of 1,950 psi. During the year it produced 63 bbl of separator liquids along with the gas produced.

Long North is a one well field discovered by W. A. Delaney, Jr. by drilling the Logsdon No. 1, NW-SE-NW, Section 2-8N-9E. It is producing from a 20 ft. pay section of the Cromwell Sand at a total depth of 3,330 ft. The well completed in September, 1949, with initial oil production of 32 B/D had a cumulative production of 2,120 bbl for the year. One dry hole has been drilled one-half mile Southeast of the discovery well.

Pecan Grove Gulf Oil Corp. and F. B. Murta completed their Davis No. 1 SW-SW-NW Section 20-8N-9E, February 17, 1949, to open this field. Initially the well flowed 14 bbl of oil, and 8 MMcf of gas per day, producing from a pay zone of the Cromwell Sand approximately 15 ft. in thickness. Later it was drilled deeper to the Second Wilcox Sand, total depth 4,345 ft; from which it pumped 7 B/D. The field at the end of 1949 had four producing wells with a daily average production of 21 bbl with a cumulative oil production of 25,536 bbl. One dry hole has been drilled in NE-NE-SE Section 19-8N-9E bordering on the Southwest flank of the field.

OKFUSKEE COUNTY

Rusk N. W. Initial test of the discovery well for this field was highly commendable, however, additional testing has been slow. J. E. Crosbie's Cosgrove No. 1 NE-NW-SW Section 1-11N-7E flowed 200 bbl of oil in sixteen hours, being completed in the Hunton Lime at a total depth of 4,235 ft. Since the above completion, in October 1949, only one well has been drilled, which was completed as a dry hole in the NE-NE-SW of the same section. Production during December averaged 58 B/D from the field well, and it had a cumulative of 6,503 bbl at the end of the year.

Valley Grove N. E. is a one well field discovered by Armer and Culham in October 1949, when they drilled the Seran No. 1 Section 30-13N-9E. Drilled to 4,120 ft. it was plugged back to 3,420 ft. and completed in the Dutcher Sand for 30 bbl of oil in 24 hours. A direct off-set to

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the discovery well was abandoned with only a slight show of oil in the Viola Lime. Production during December averaged 12 B/D, with a cumulative of 1,069 bbl as of January 1, 1950.

POTTAWATOMIE COUNTY

Burnett N. W. is a one well field that has not created sufficient interest to induce additional drilling. The Derby Oil Co.'s discovery well, Bailey No. 1 NW-SE-NE Section 9-8N-2E was completed May 3, 1949, producing 15 bbl of oil and 40 bbl of water per day from the Hunton Lime, at a total depth of 5,205 ft. December production averaged 17 B/D, with a cumulative oil production of 1,313 bbl.

Morvin West was the first field discovered in the Seminole Area during 1949. It was opened by the Cities Service Oil Co.'s Fleming No. 1 NW-SW-SW Section 31-9N-3E January 1, 1949. Upon completion the well produced 43 B/D by pumping test from the Hunton Lime, at a total depth of 5,025 ft. A second well has been drilled by Cities Service Oil Co. in the SE-SE-SE of Section 36-9N-2E. The two wells had a total production of 21 B/D during December 1949, and at the year's end had a cumulative of 9,701 bbl.

Musson S. W. was opened December 27, 1949 by Gulf Coast and Western Oil Co., when they completed their Rose No. 1, NE-SW-SW Section 10-10N-4E, a Wilcox Sand well, having a total depth of 5,527 ft. A swabbing test, the only report available, amounted to 76 bbl of oil and 96 bbl of water per day.

Red Hill A slight amount of oil was found in the Unconformative Sand by Davon Oil Co. at their Santa Fe Gun Club No. 1, Section 26-11N-4E. Total depth was 5,578 ft. Drilled in May 1949, it was abandoned in September of the same year after producing only 740 bbl.

Wanette East was discovered by Bert Aston when he drilled the Neal No. 1 NE-SE-NE Section 30-6N-3E. The well was completed in the Layton Sand, of Pennsylvanian Age, having a pay zone approximately 17 ft. in thickness, at a total depth 3,124 ft. On its initial pumping test March 3, 1949 it produced 35 B/D. The field has been extended with the drilling of four additional wells, located in the NW/4 Section 29 and NE/4 Section 30. Daily average production of the field for the month of December was 147 bbl, with a cumulative production of 16,984 bbl.

Unnamed Pool Pottawatomie County. Sterling Oil Co. drilled this well, the L. A. White No. 1 NE-SW-NE Section 9-11N-6E, to the Hunton Lime, at a total depth of 4,423 ft. When tested it pumped only five bbl of oil with 100 bbl of water. No further production information was available by the year's end.

SEMINOLE COUNTY

Sylvian East has been a rapidly expanding field with seven additional wells drilled since April 1949, when Sam King et al drilled their Kelly No. 1, Section 12-10N-7E. Total depth of the initial well is 3,605 ft., where it is producing from the Union Valley Sand of Lower Pennsylvanian Age. Initially the well pumped 45 bbl of oil and 12 bbl of water. Daily average production for the month of December was 562 bbl, with a cumulative of 75,297 bbl. It has an estimated productive area of 130 acres. Two dry holes have been drilled, one on the north, and one on the south flanks of the field.

Transco East This field was discovered by Ashland Oil and Refining Co. with its completion of the Fore No. 1 NW-NE-NW Section 26-7N-7E in the Calvin Sand, at a total depth of 1,756 ft. On its completion on May 6, 1949 it flowed 30 B/D. Three additional wells have been drilled, of which two wells, directly off-setting the discovery to the North and West were dry holes. Josaline Production Co. has completed a small well in Section 27. Total daily average production for the field during December was 11 bbl, with a cumulative of 2,755 bbl as of January 1, 1950.

Transco N. W. Keener Oil and Gas Co. opened this field November 8, 1949 with their Norvell No. 1 SW-SW-NW Section 20-7N-7E. Total depth of the well is 1,784 ft. in the Lower Calvin Sand. Initially the well flowed 102 bbl of oil through a 24/64-in. choke. A total of five producing wells had been drilled by December 31, 1949. The field had a daily average production during December of 111 bbl with a cumulative of 5,684 bbl. Two dry holes were drilled in the vicinity, one in NE-SE-NW and one in the N/2-NE-NW of Section 20. Productive area of the field is estimated to be 100 acres.

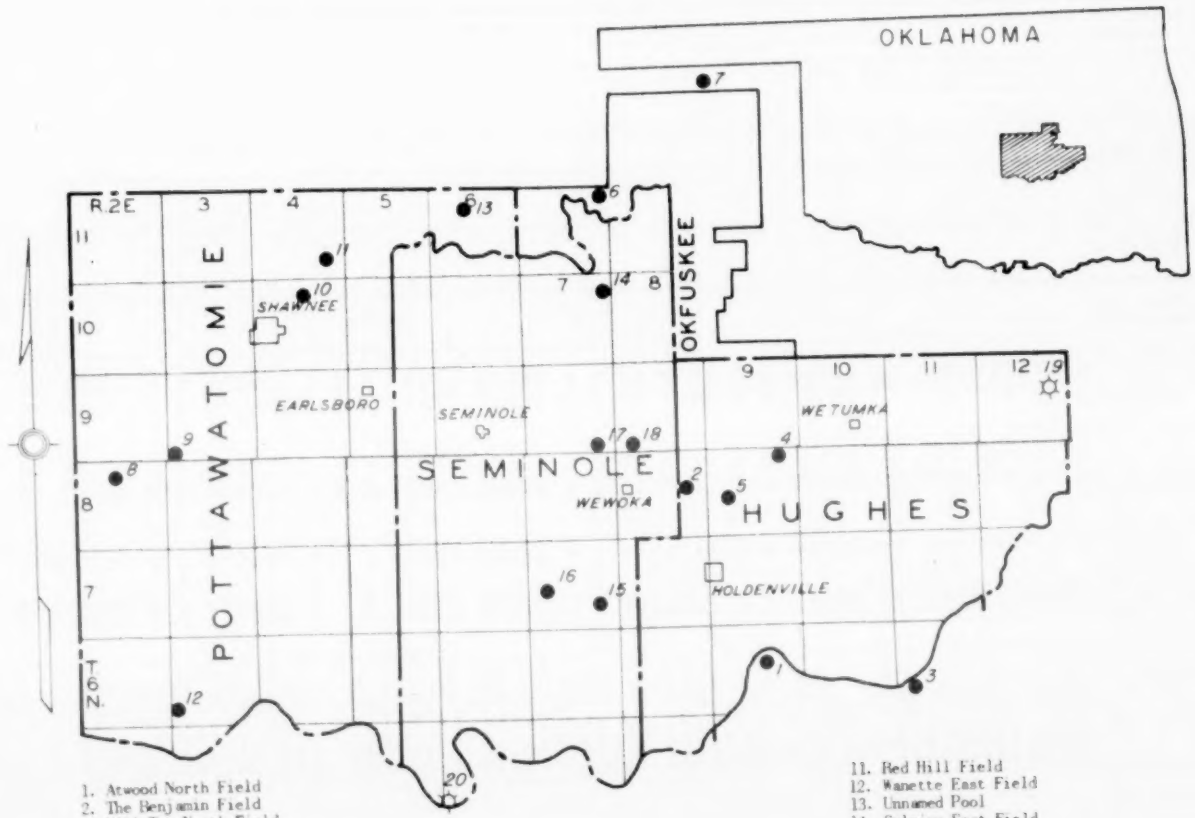
Wewoka Lake North Cummings and McIntyre discovered this field, in June, 1949, in Section 35-9N-7E with a 25 B/D well in the Booch Sand of Pennsylvanian Age. Total depth is 3,445 ft. Thus far no production history besides the initial potential is available.

Wewoka Lake N. E. was discovered in April 1949, by Murphey Oil Co.'s Roberts No. 1 Section 32-9N-8E with a total depth of 1,867 ft. in the Calvin Sand, it initially pumped 102 B/D. Four additional producing wells have been drilled. December's daily average production was 122 bbl with a cumulative at the year's end of 24,686 bbl. The productive area is surrounded by dry holes, and is not expected to exceed 100 acres.

Two small gas areas, Dustin S. E. in Hughes County, and Byng N. W. Seminole County, were discovered during 1949. At the present time they appear to be of small extent and importance.

A comparison of production figures proves that the total production of the Seminole Area during 1949 was seven and one-half per cent less than that of 1948. Total production of the Seminole Area during 1949 was 18,526,305 bbl, a daily average of 50,757 bbl. New fields discovered during 1949 accounted for 208,719 bbl, yielding an average of 572 B/D, based on the entire year. However, the above mentioned new fields had a total average production of 1,880 B/D during the month of December. In comparison, total production of the area during 1948 was 20,029,640, an average of 54,874 B/D. The new fields accounted for 134,221 bbl for the year 1948, an average of 372 B/D. Production derived from fields drilled previous to 1949 yielded an average of 50,185 B/D; fields of the same category the previous year reached an average of 54,508 B/D. The difference amounts to a reduction of 7.93 per cent.

No gas production figures are available for the subject area for the year 1949.



1. Atwood North Field
2. The Benjamin Field
3. Hill Top North Field
4. Long North Field
5. Pecan Grove Field
6. Rusk N. W. Field
7. Valley Grove N. E. Field
8. Burnett N. W. Field
9. Morvin West Field
10. Musson S. W. Field
11. Red Hill Field
12. Wanette East Field
13. Unnamed Pool
14. Sylvian East Field
15. Transco East Field
16. Transco N. W. Field
17. Wewoka Lake North Field
18. Wewoka Lake N. E. Field
19. Dustin S. E.
20. Byng N. W.

FIG. 1 - FIELDS DISCOVERED DURING 1949 IN SEMINOLE AREA, OKLAHOMA

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR SEMINOLE AREA, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION[c] CU FT TO END OF 1949	MILLION[c] CU FT DURING 1949		TO END OF 1949	DURING 1949
	Hughes											
1	Adams	Missener, Mis	1935	200	2,622,084	57,621						
2	Adams (Northwest)	Gilcrease, Pen	1946	20	x	0						
3	Alabama	Pen Sds, Pen	1923	550	x	24,317						
4	Alabama (Southwest)	Cromwell, Pen	1948		259,233	202,738						
5	Atwood (North)	Hoach	1949	20	4,105	4,105						
6	Benjamin	Cromwell	1949	120	40,351	40,351						
7	Bichner	Hoach, Cromwell, Pen	1924	60	712,900	10,272						
8	Calvin	Pen Sds, Wilcox, Ord	1938	80	113,713	6,498						
9	Catra	Bromide, Ord	1937			Abd.						
10	Fish	Pen Sds, Wilcox, Ord	1934	1,220	20,891,308	190,161						
11	Fish (East)	1st Hoach, Pen	1948	50	18,592	11,178						
12	Frean	Cromwell Gilcrease, Pen	1938	40	35,207	270						
13	Fishman	Cromwell, Pen	1925	250	1,821,627	1,871						
14	Gilcrease	Gilcrease, Cromwell, Pen	1924	245		Abd.						
15	Greasy Creek	Cromwell, Pen	1946	210	241,725	239,643						
16	Grief Creek	Hoach, Pen	1946	650	1,269,633	158,743						
17	Hankins (Northwest)	Hoach, Pen	1944	1,800	1,373,960	112,080						
18	Holdenville	Hoach, Pen	1946	200	143,713	38,425						
19	Holdenville (North)	Hoach, Cromwell, Wilcox Pen, Ord	1926	80	145,006	Abd.						
20	Holdenville (East)	Calvin, Pen Hoach, Pen	1946	300	315,874	70,413						
21	Holdenville (West)	Gilcrease, Pen Wilcox, Ord	1930	1,320	6,715,624	296,013						
22	Horns Corner	1st & 2nd Cromwell, Pen	1943	650	1,872,424	122,211						
23	Horns Corner (North)	Cromwell, Pen	1944	290	710,145	38,153						
24	Jefferson	Wapanucka, Pen	1925	x								
25	Jefferson (North)	Wapanucka, Pen	1946	40	34,321	9,937						
26	Lamar		1923	x								
27	Long	Cromwell, Pen	1927	x	105,359	1,880						
28	Long (North)	Cromwell Calvin	1949	10	2,118	2,118						
29	Papoose	Gilcrease, Pen Cromwell	1923	2,260	22,854,791	95,543						
30	Pecan Grove	Cromwell, Pen, Wilcox, Ord	1949	40	25,536	25,536						
31	Spaulding	Hoach, Pen	1929	600	259,904	36,864						
32	Spaulding (South)	Hoach, Pen	1943	480	131,141	14,458						
33	Spaulding (Southeast)	Hoach, Pen	1939	380	104,624	11,812						
34	Spaulding Tunnite	Hoach, Calvin, Pen	1947	280	165,537	26,870						
35	Wetumka	Various Pen, Hunton, Sil, Dev	1923	200	897,122	15,928						
36	Wetumka (East)	Wilcox, Ord	1938	80		Abd.						
37	Wetumka (South)	Gilcrease, Crom, Pen	1926	230	128,745	1,601						
38	Wetumka (Southeast)	Cromwell, Pen	1947	160	212,189	30,981						
39	Yeager	Pen Sds, Wilcox, Ord Hoach 2nd Wilcox, Ord	1925	360	2,172,976	48,089						
40	Yeager (North)	Cromwell, Pen Hunton, Sil, Dev	1936	200	276,997	13,223						
41	Miscellaneous				469,962	93,073						
	Pittsburg											
42	Bearden (Northeast)	Gilcrease, Pen Hoach, Cromwell, Pen	1947	Abd. 60		Abd.						
43	Bearden (Northwest)	Hunton, Sil, Dev	1941	1,240	1,459,217	128,362						
44	Castle	Hoach, Hunton, Pen, Sil	1941	100	278,836	18,443						
45	Castle (East)	Cromwell, Gil, Pen	1944	350	662,835	445,101						
46	Castle (North)	Cromwell, Pen	1941	80	126,165	13,164						
47	Castle (South)	Hunton, Sil, Dev	1941	30	97,860	9,026						
48	Cromwell (East)	Crom, Hunt, Wilcox, Pen Sil, Dev, Ord	1938	980	6,490,029	231,252						
49	Dill	Senora, Crom, Pen Hunton, Sil, Dev	1931	1,260	6,143,660	126,268						
50	Dill (Northeast)	Cromwell, Pen Hunton, Sil, Dev	1943	340	544,676	63,910						
51	Greenlease	Hunton, Sil, Dev	1944	130	106,614	11,747						
52	Keokuk (Northeast)	Calvin, Pen	1947	110	129,115	38,381						
53	Olympic	Senora, Crom, Pen	1934	4,000	14,167,093	282,409						
54	Rusk	Cromwell, Pen	1941	240	1,899,564	68,123						
55	Rusk (Northeast)			10	6,503	6,503						
56	Valley Grove	Gilcrease, Pen	1944	100								
57	Valley Grove (Northeast)			20	1,069	1,069						
58	Valley Grove (South)	Cromwell, Pen	1947	60	39,545	9,192						
	Pottawatomie											
59	Asher	Wanette, Pen Viola, Ord	1929	240	3,832,809	21,898						
60	Asher (South)	Wanette, Pen	1947	30	17,541	3,389						
61	Asher (Southeast)	Wanette, Pen	1948	10	366	120						
62	Asher (West)	Wanette, Pen Viola, Ord	1930	660	7,979,112	40,250						
63	Avoca	Viola, Wa Earls, Ord, Pen	1938	380	1,737,880	79,021						
64	Avoca (Southwest)	Viola, Sil, Dev	1948	160	105,938	55,150						

LINE NUMBER	NUMBER OF WELLS[d]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT[l]	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
1	10	0	1		7					40		S		4,317	15	A	Wilcox	4,317
2	1	0	1		0							S		3,262	7	M L		
3	17	0	1		14					39		S		1,725	20	T		
4	12	4			12					41		S		3,060	15	*		
5	2	2			2													
6	13	13			13													
7	6	2			3					35		S		3,400	20	A		
8	6				1					36		S L		4,400	70	A		
9	Abd.				Abd.							S		5,800	39			
10		2	9		115					37		S		4,265	44	A F		
11	5		1		4							S		2,819	15			
12					1							S		3,128	15			
														3,350	60			
13	28				1					37		S		3,580	20	A F		
14	Abd.				Abd.							S						
15	9	2			7					42		S		3,405	30	A		
16	59	1	2		53					39		S		2,884		M C		
17	106				106					36		S		2,633	32	M L		
18	18		1		14					38		S		2,826	25	A		
19	Abd.				Abd.					40		S		3,418	19			
										28		S		885	21	M C		
20	46	16	1		44									x				
										37		S		3,175	20	A		
21	170	10	1		112									x				
												S		3,833	25	A	Wilcox	5,105
22	27				23							S		3,582	8	A F		
23	13				10													
24	Abd.				Abd.							L		3,264	12	M C		
25	4	1			4													
26										39		S		3,400	20			
27		2			3													
28					1									1,100	10			
										35		S		3,070	25	A	Wilcox	x
29	220	2	2		27									3,350	55			
												S		2,600	15	M C		
30	4	4			4													
										35		S		2,635	20	M C		
31	28	4	3		23					33		S		2,635	20	M C		
32	12	4			12							S		2,648	22	M C		
33	9		1		5							x		2,700	x	M		
34	21				19							S L		3,755	x	A F		
35	17		1		4					38								
										53		L - S		3,150-3,900	x	A		
36	7		1		Abd.					38		S		2,800-3,050	10-60	A		
37	8				1							S		2,250		M C		
38	10				10					39		S L S		1,920	90-80	A F		
39					8									2,300				
														1,790				
										37		S S L		3,050	106	A F		
40	12				5									3,600				
41		22	7		32													
												S		2,950		M C		
42	Abd.				Abd.							S		3,000				
												L		3,986	24	A		
43	37	1			30					43		S L		3,900	60	A	Wilcox	4,100
44	7	1			4							S		3,272	23	M C	Wilcox	4,056
45	51	29			36					41		S		3,710	13	A	Wilcox	3,977
46	4				4					43		L		3,930	12	A	Wilcox	4,274
47	3				2					36		S L S		3,400	55	x		
48	83	1			66													
										36		S S L		3,600		A		
49	141		1		69									3,900		A F		
										37		S		3,498		M C		
50	17	2			12							L		x		A		
										43		L		3,898	x	A		
51	5		1		4							S		2,700	x	A		
52	8				8					34		S		3,433	x	M L		
53	350		4		297					38		S		3,691	35	A		
54	11		2		9													
55					1					24		S		3,540	8	M C		
56	Abd.				Abd.													
57					1							S		3,755	x	M C		
58	2				2													
												S L		3,700	50	A		
										39		S		3,300	10	M C		
59	6				5							S		3,150	10	A		
60	4				4													
61	1				1					43		S L		3,450				
62	23				20									3,860	40	A F		
										39		S L			x	A		
63	32	8	1		25													
												L		4,295	x	A		
64		2			8													

* Stratigraphic

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SEMINOLE AREA, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
65	Brooksville	Hunton, Sil, Dev	1942	440	835,973	13,599						
66	Brooksville (South)	Hunton, Sil, Dev	1943	40	70,913	2,424						
67	Burnett (Northwest)	Hunton	1949	10	1,313	1,313						
68	Burnett (West)	2nd Wx, Bois d'Arc, Ord, Sil, Dev	1943	170	857,979	82,159						
69	Bears (North)	Layton, Pen	1945	130	120,042	17,529						
70	Centerpoint	Dolomite, Ord	1942	280	489,359	47,473						
71	Centerpoint (South)	Earlsboro, Penn	1944	60	67,121	22,712						
72	Earlsboro (Northwest)	Earlsboro, Pen	1942	300	441,160	26,738						
73	Earlsboro (West), Hitzulke	Hunton, Sil, Dev Wanette, Pen	1924	3,500	4,401,768	69,454						
74	Gray	Hunton, Sil, Dev Simpson, Ord	1932	320	6,390,450	181,912						
75	Grasso	Hunton, Sil, Dev Simpson, Ord	1934	40	444,914	7,777						
76	Hitzulke (West)	Viola, Ord Wilcox, Ord	1941	460	1,952,187	27,171						
77	King	Hunton, Viola Sil, Dev, Ord	1939	60	183,698	5,787						
78	King (West)	Hunton, Sil, Dev	1939	60	283,435	45,752						
79	Lake Shawnee	Wilcox, Ord	1943	40	102,332	10,541						
80	Lake Shawnee (West)	Wilcox, Ord	1947	70	309,969	84,250						
81	Macomb	Hunton, Sil, Dev	1942	180	124,131	12,611						
82	Macomb (South)	Hunton, Sil, Dev Misener, Pen	1943	80	215,287	9,038						
83	Maud	Hunton, Sil, Dev Simpson, Ord	1916	1,650	13,040,063	78,730						
84	Maud (South)	Simpson, Ord	1941	190	667,195	18,070						
85	Moral (Northeast)	Hunton, Sil, Dev	1944	440	455,562	117,286						
86	Murvin (West)	Hunton	1949	40	9,701	9,701						
87	Museum (Southwest)	Wilcox	1949	40	x	x						
88	Prague	Senora, Pen	1940	340	1,591,109	69,581						
89	Romulus	Hunton, Sil, Dev	1940	440	1,688,299	19,669						
90	Romulus Townsite	Hunton, Sil, Dev Layton	1942	60	187,685	24,218						
91	Rover	Trenton, Viola, Hoover	1945	430	1,000,598	181,777						
92	Red Hill	Unconformative Sand	1949		741	741						
93	Sacred Heart	Earlsboro, Pen	1939	80	430,341	8,988						
94	Shawnee	Earlsboro, Pen	1934	740	4,225,892	124,998						
95	Shawnee (East) 'A'	Bartlesville, Wilcox, Pen, Ord	1937	300	85,769	85,704						
96	Shawnee (North)	Simpson, Ord	1937	200	794,384	22,806						
97	Shawnee (Northeast)	Wilcox, Ord	1942	400	2,302,090	242,319						
98	Shawnee (South)	Wilcox, Ord	1943	80	146,524	16,916						
99	Shawnee (Southeast)	Hunton, Sil, Dev	1943	40	18,250	2,611						
100	St. Louis	Pen Sds., Pen	1927	21,390	172,858,359	1,304,625						
101	St. Louis (East)	Wilcox, Ord	1941	80	274,736	8,040						
102	St. Louis (North)	Hunton, Wilcox, Sil, Dev, Ord	1941	1,300	1,428,802	146,917						
103	Tecumseh	Simpson, Ord	1937	20	216,486	9,037						
104	Tecumseh (East)	Viola, Ord Wilcox, Ord	1941	180	467,563	0						
105	Tecumseh Lake	1st Wilcox, Ord	1941	120	1,253,749	7,075						
106	Tribbey (North)	Wilcox, Ord	1946	110	897,662	302,630						
107	Unionpoint	Wilcox, Ord	1948	60	48,939	45,715						
108	Victory Hill	Earlsboro, Pen	1946	250	335,918	119,131						
109	Wanette	Viola, Sil, Dev	1943	40								
110	Wanette (East)	Layton	1949	50	16,984	16,984						
111	Wanette (Southwest)	Simpson, Dolomite, Ord	1948	10	6,157	1,851						
112	Wanette (West)	Dolomite, Ord	1943	80	25,092	2,803						
113	Miscellaneous Seminole				142,874	56,726						
114	Allen Deep	Cromwell Hunton Wilcox	1927	5,660	60,975,170	1,340,335						
115	Bethel	Booch, Cromwell Pen Gilcrease	1925	540	2,180,741	36,535						
116	Bethel (North)	Cromwell, Pen	1936	470	5,055,724	83,384						
117	Bethel (Northeast)	Cromwell, Pen	1941	130	62,818	5,205						
118	Bethel (West)	Cromwell, Pen	1941	350	726,528	109,973						
119	Bowlegs	Hunton, Sil, Dev Wilcox, Ord	1926	3,145	130,322,250	1,186,883						
120	Butner	Cromwell, Gilcrease, Pen, Misener, Miss	1947	30	22,129	13,118						
121	Carr City	Hunton, Sil, Dev Wilcox, Ord	1927	1,340	44,670,886	326,333						
122	Chevarha (Seminole)	Booch, Pen	1944	2,030	3,800,820	238,748						
123	Chevarha (Southwest)	Booch, Pen	1945	20	34,180	5,374						
124	Cromwell	Cromwell, Pen Wilcox, Ord	1923	4,190	62,822,034	589,663						
125	Cromwell (South)	Wapanucka, Cromwell Wilcox, Ord	1937	90	747,755	17,628						
126	Dill (South)	Hunton, Sil, Dev	1941	60	261,750	8,978						

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
65	11		1		7					32		L		5,100	47	M C		
66	1				1					33		L		4,849	16		2nd Wilcox	5,481
67					1													
68	9				9							S		6,851	x	A		
														2,848	x	A		
69	8	1			8							S		5,593	13	A F		
70	10				8							D		4,915	11	M L		
71	3				3					39		S		3,875	20	M C		
72	9		1		8					37		S		4,200	40	A		
73	43	1	2		25					38		L			x			
										40		L			x	A	Wilcox	3,500
74	27		1		19							S			x			
										36		L		4,100	50	A	Wilcox	4,860
75	3				3							S			x			
										38		L		4,597	30	A		
76	24		3		9							S			x			
77	4				3					41		L		4,374	42	A		
										41		L		4,281	25	A		
78	6				1					40		S		5,877	8	A		
79	1				1							S		6,000	x	A		
80	4				4					34		L		5,250	198	M C		
81	4				3					35		L		4,664	96	A	2nd Wilcox	5,451
82	3				3							S		2,950	x			
										38		L		4,830	45	A	Wilcox	4,330
83	51		1		44							S		4,242	30			
										40		D		4,320	5	A		
84	8		1		6							L		4,640	5	A		
85	12	4			11													
86	2	2			2									5,527				
87	1	1			1									3,250				
88	23	1			17					34		S		4,500				
89	21				10					38		L		4,404				
90	38				3					33		L		2,825				
												S		3,960				
												L		5,800				
91		4			17							S		1,800				
92	1	1	1		Abd.													
93	8				4					32		S		2,862				
94	54		2		36					34		S		4,440				
95	7				7													
96	6				4					36		S		4,853				
97	7				7					33		S		4,853				
98	2				2					37		S L		5,424				
99	1				1					42		L		5,110			Wilcox	5,511
100		1	1		372					38		S L					Arbuckle	
101	7				4					37		S		4,111				
102	45	8	2		33					38		L		3,863				
103	1				1					37		D		5,125				
104	7		1		Abd.					35		L		4,582				
												S		4,835				
										38		S		5,234				
105	12		3		1							S		5,637				
106	9	2			9									5,950				
107	3	2			3									7,790				
108	16	5			16					36		S		4,140			2nd Wilcox	4,695
109	Abd.				Abd.					38		L						
110	4	4			4							D		4,580				
111	1				1													
												G		5,040				
112	1				1													
113	9	2			9													
														2,620				
										36		Ch L		3,750				
114	26	6			302							S		4,100				
														3,300				
115										36		S			x	A F		
	62				35									3,342	15			
116	31				23					40		S		3,461	20	A		
117	3				2					34		S		3,572		A		
118	31	4	1		33					39		S		3,450	55	A		
119	367	3	2		182					40		L		4,000	10	A		
												S		4,280	30			
120	3				3							S		3,743	75	A F		
														3,375				
121	119		2		53					40		S L		4,180	15	A F		
												S		4,205	28			
122	110		3		104					40		S		3,429	12	M L	Cromwell	3,563
123	1				1							S		3,664		M L		
124	640	2	3		206					37		S		3,470	90	A F	Arbuckle	
												S		4,550	30			
125	8	1	2		3					37		S		4,176	13	A		
												S						
126	4		1		3					40		L		4,128	22	A		

* Stratigraphic

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SEMINOLE AREA, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
127	Dora	Bgy Calvin, Pen	1935	1,200	6,340,853	157,377						
128	Earlsboro	Earlsboro, Pen Hunton, Sil, Dev Simpson, Wilcox, Ord	1926	3,540	131,716,239	539,278						
129	Earlsboro (East)	Earlsboro, Pen Hunton, Sil, Dev Wilcox, Ord	1929	1,560	41,875,035	311,176						
130	Earlsboro (North)	Hunton, Sil, Dev Wilcox, Ord Calvin, Pen	1936	458	9,321,409	212,829						
131	Earlsboro (South)	Hunton, Sil, Dev Wilcox, Ord	1930	420	10,302,112	129,483						
132	Fish (West)	Hooch, Pen	1941	20	47,870	3,814						
133	Gavcreek	Cal, Hooch, Cros, Pen	1946	400	1,180,401	120,121						
134	Grayson	Simpson, Ord	1935	600	3,439,101	228,904						
135	Grayson (North)	Hunton, Sil, Dev	1942	30	4,801	0						
136	Haney (East)	Hooch, Cros, Pen	1927	340	1,415,510	214,560						
137	Hazel	Cal, Thurman Bggy, Pen	1938	750	1,321,201	108,378						
138	Jackson	Hooch, Pen	1925	900	1,653,661	77,862						
139	Keokuk	Misener, Mis, Hunton, Sil, Dev, Wx, Ord.	1933	2,580	16,094,274	289,140						
140	Keokuk, (Southwest)	Misener, Mis	1948	20	11,783	8,907						
141	Kidd	Senora, Pen Earlsboro, Pen	1941	40	17,178	842						
142	Konawa	Cromwell, Pen Simpson, Ord	1929	1,430	17,586,891	300,271						
143	Konawa, East	Earlsboro, Pen	1936	110	263,227	3,544						
144	Konawa (South)	Hunton, Sil, Dev Viola, Wilcox, Ord	1938	600	1,775,966	52,754						
145	Konawa (West)	Bggy Calvin, Pen	1938	300	1,126,321	48,368						
146	Lima	Cromwell, Pen	1942	90	135,811	34,227						
147	Lima (Southeast)	Cromwell, Pen Pen Sd, Cromwell, Pen	1947	60	75,444	13,292						
148	Little River	Hunton, Sil, Dev Wilcox, Ord	1927	3,900	123,019,202	1,303,339						
149	Little River (East)	Pen Sds, Pen Wilcox, Ord	1928	860	17,769,654	97,685						
150	Little River (North)	Hunton, Simpson	1941	300	834,418	31,386						
151	Little River (Southeast)	Senora, Pen	1940	50	76,808	6,668						
152	Little River (West)	Wilcox, Ord	1938	210	1,240,957	27,133						
153	Mission	Hunt, Sil, Dev, Wx, Ord	1928	1,100	27,509,223	153,132						
154	Otis	Cromwell, Pen	1946	70	122,440	30,974						
155	Romona	Hooch, Pen	1924	720	2,231,365	80,758						
156	Sanco	Galcrease, Pen Cromwell, Pen	1929	260	637,755	130,478						
157	Sasakwa	Pen Sands, Pen Wilcox, Ord	1927	695	12,701,526	165,665						
158	Sasakwa (East)	Senora, Pen	1937	40	97,423	9,246						
159	Sasakwa Townsite	Wilcox, Ord	1933	90	2,862,048	42,294						
160	Searight	Hunton, Sil, Dev Wilcox, Ord	1926	1,560	36,221,474	238,691						
161	Searight (North)	Wilcox, Ord	1934	240	4,573,616	100,591						
162	Searight (East)	Wilcox, Ord	1939	80	213,668	1,860						
163	Seminole City	Pen Sds, Hunton, Sil, Dev, Wilcox, Ord Cromwell, Pen	1926	7,350	140,372,884	273,740						
164	Seminole (East)	Hunton, Sil, Dev Wilcox, Ord	1926	2,210	9,508,435	116,937						
165	Seminole (North)	Senora, Pen	1940	120	188,137	9,384						
166	Seminole (West)	Calvin, Pen, Wilcox, Ord	1935	310	15,799,212	170,801						
167	Sess	Thurman, Pen	1938	30	27,917	1,941						
168	Sylvian	Wilcox, Cromwell	1941	340	1,326,116	173,083						
169	Sylvian (East)	Union Valley	1949	70	75,297	75,297						
170	Sylvian (Northeast)	Cromwell, Pen	1942	80	58,697	2,168						
171	Sylvian (Southeast)	Galcrease, Pen	1945	30	11,369	2,652						
172	Transco	Senora	1941	60								
173	Transco (East)	Upper Calvin	1949	30	2,755	2,755						
174	Transco (Northwest)	Lower Calvin	1949	10	5,684	5,684						
175	Transco (West)	Calvin, Senora, Pen	1941	60	101,905	24,303						
176	Trough Deep	Simpson, Ord Wilcox, Ord	1937	80	1,133,620	18,208						
177	Trough Shallow	Earlsboro, Pen	1937	110	1,335,508	59,066						
178	Twin Lakes	Wapanucka, Pen	1946	80	145,661	28,602						
179	Tyrola	Hunton, Sil, Dev	1937	60	139,185	8,825						
180	Tyrola (East)	Senora, Pen	1943	80								
181	Tyrola (Northwest)	Senora, Pen	1947	20	8,518	1,556						
182	Wetley	Hunton, Sil, Dev Cros, Pen, Hunt, Sil, Dev	1927	540	727,197	22,934						
183	Wewoka	Wilcox, Ord Hunton, Sil, Dev	1912	1,970	36,256,221	260,749						
184	Wewoka (East)	Wilcox	1927	220	1,695,568	15,465						

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT / NET	STRUCTURE[p]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
127	193		3		94					35		S	S	3508-4315	25-12	M L		
128	457	3	3		132					38		L S	S	3,500 4,300	10 10	A		
129	166				56					39		S L	S	3,500 4,250	10 16	A F		
130	43	1	2		31					41		L S	L	4,374 4,660	x 20	D		
131	44				25					39		S L	S	2,960 x	5 x	A		
132	1				1					36		S	S	4,300 3,160	4 24	M L		
133	20		2		15					41		S	S	3,740	24	A		
134	50				35					41		D	D	4,030	20	A		
135		1			Abd.							L	L	4,160	10	A		
136	27	3			27							S	S	3663-3661	x-x	*		
137			4		41					36		S	S	2500-2990	30-15	*		
138	69				58					38		S	S	3,300	45	A		
139	142	1	2		89					40		S L	S	4,125 4,145	20 25	A F		
140	3				1					38		S	S	4,500 4,175	10 20	*		
141	11				3							S	S	2,125 2,291	20 15	*		
142		1	2		76					36		S	S	2,900 3,860	20 10	A F		
143	11		4		1					39		S	S	2,500	30	M L		
144	54	1			35					37		L	L	2,500	50	A		
145	29	2			24					36		L-S S	S	2,697	x 17	M L		
146	5				4							S	S	3,300	20	A		
147	7				5							S	S	3,300 3,190	50	M L		
148	471	5	6		185					38		L S	L	4,150	72	A		
149	100	2	3		27					36		S	S	3,150 4,250	20 15	A		
150	5				5					41		L D S	S	4,282	7	A		
151	4				4					38		S	S	2,300	20	M L		
152	16				8					39		S	S	4,378	2	A		
153	38				38					39		L-S	L-S	3508-4315		A		
154	5				5							S	S	3,278	16	A F		
155	56	1	2		43					38		S	S	3,034	20	A		
156	18	1			13					37		S	S	3,300 3,350		A		
157	61	1	2		53					36		S	S	2,793 4,187	13 40	A	Gulcreame	2,610
158	3	1			2					37		S	S	1,265 4,048	10 3	M L A F		
159	7				7							L	L	3,886	25	A		
160	63	6	1		50					38		S	S	4,325 4,596	100			
161	18				9					39		S	S	3,775	16	M U		
162	4				4					39		L	L	3,910	16			
163			5		165							S	S	4,305 3,425	125 15	A		
164	119	1	3		53					38		L S	L	4,100 4,350	60 10	A		
165	7		1		5					31		S	S	2,900	15	A		
166	46	1	6		20					42		S	S	4,300	30	A		
167	1				1					36		S	S	2,671	20	M L		
168	34		1		32					41		S	S	4,366	18	A		
169	8	8			8					37		S	S	3,691	14	A		
170	2				1							S	S	3,665		A		
171	2				1													
172	Abd.				Abd.													
173	2	2			2													
174	5	5			5							S	S	2,000		M L		
175	5				5					36		S	S	3,520		M L		
176	14				6									3,775				
177	31	1	3		22					33		S	S	2,347	13	M L		
178	5		1		4					44		L	L	3,423	7	A		
179	8	3			6					37		L	L	3,317	80	A		
180	Abd.				Abd.					26		S	S	1,808	15	A	Sand 2,809	
181	1				1							S	S	1,900	10	*		
182	33		4		12					35		L	L	2,420	165	A		
183	226		1		78					37		S	S	2,500	90			
184	18				7					38		L S	L	3,873 4,148	78 20	A		
												L-S	S	3,250 3,900 4,200	15 25 10	A		

* Stratigraphic

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SEMINOLE AREA, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION AREA PROVED ACRES	OIL PRODUCTION BARRELS TO END OF 1949	OIL PRODUCTION BARRELS DURING 1949	GAS PRODUCTION AREA PROVED ACRES	GAS PRODUCTION MILLION CU. FT.[c] TO END OF 1949	GAS PRODUCTION MILLION CU. FT.[c] DURING 1949	GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl TO END OF 1949	CONDENSATE PRODUCTION Thousands of Bbl DURING 1949
185	Wewoka Lake	Booch, Pen	1943	1,000	1,230,019	86,742						
186	Wewoka (North)	Wilcox, Ord	1940	140	424,452	23,620						
187	Wewoka (Northeast)	Misener, Mis, Hunt, Sil, Dev	1941	430	1,795,146	79,419						
188	Wewoka Townsite	Penn Sds, Pen Hunton, Sil, Dev Wilcox, Ord	1924	250	6,770,718	81,383						
189	Wewoka Lake (North)	Booch	1949	40	x	x						
190	Wofford	Hoggy, Pen, Wilcox, Ord	1935	80	727,795	8,364						
191	Wofford (South)	Semora, Pen	1945	x	81,222	37,607						
192	Miscellaneous			x	306,419	76,300						
						18,113,811						

TABLE 2 - SUMMARY OF DRILLING OPERATIONS IN SEMINOLE AREA, OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC.	LOCATION TWP.	LOCATION RGE.	LOCATION SURVEY	LOCATION LAT.	LOCATION LONG.	TOTAL DEPTH FT. OR PLUG BACK	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL N. BBL.	INITIAL PRODUCTION PER DAY GAS MILLION CU. FT.	INITIAL PRODUCTION PER DAY GASOLINE U.S. BBL.	GRAV. FRACTING OR FLOWING	PRESSURES LBS. PER SQ. IN. CASING	PRESSURES LBS. PER SQ. IN. TUBING	REMARKS
1	Hughes	14	8 N	8 E				3,360	Pen	Cromwell	Chapman	10			3/4	150	100	Disc. Benjamin
2	Hughes	32	6 N	11 E				6,130	Pen	2nd Wilcox	Pure		2.6			1,948		Disc. Hilltop No.
3	Hughes	35	9 N	8 E				3,515	Pen	Cromwell	J. Lagon & Sons							Abd.
4	Hughes	23	8 N	11 E				3,980	Pen	Cromwell	Mid Continent							Abd.
5	Hughes	20	8 N	9 E				3,336	Pen	Cromwell	F. B. Mutts	12	33.9					Disc. Pecan Grove
6	Hughes	30	9 N	12 E				3,360	Pen	Cromwell	Howell & Howell							Abd.
7	Hughes	23	7 N	9 E				3,442	Pen	Calcrease	H. H. Diamond							Abd.
8	Hughes	25	7 N	8 E				960	Pen	Calvin	Kansas Oper. Co.							Abd.
9	Hughes	33	5 N	11 E				2,901	Pen	No Tops	W. B. Pine							Abd.
10	Hughes	14	8 N	10 E				3,296	Pen	Cromwell	Mid Continent	9			1/2			Wildcat disc. included in Greasy Creek District old well reperforated
11	Hughes	15	6 N	9 E				5,449	Pen	2nd Wilcox	Atlantic Refg.							Abd.
12	Hughes	14	9 N	12 E				3,496	Pen	L. Cromwell	J. Josephson & V. E. Autry		18					Disc. Dustin S.E.
13	Hughes	19	9 N	8 E				3,018	Pen	Cromwell	Deep Rock							Abd.
14	Hughes	2	8 N	9 E				3,330	Pen	Cromwell	W. A. Delaney	32						Disc. Long North
15	Hughes	15	6 N	9 E				2,871	Pen	Booch	Warren-Bradshaw	32						old well plugged back. Disc. Atwood North
16	Hughes	34	8 N	10 E				2,575	Pen	2nd Booch	J. T. Hall, et al.							Abd.
17	Hughes	19	9 N	11 E				3,215	Pen	Jefferson	Darks							O & A
18	Hughes	29	8 N	10 E				3,515	Pen	Atoka	G. W. Deck, et al.							Dry Hole
19	Okfuskee	30	13 N	9 E					Pen	Ditcher	Arner & Gilbert	30						Disc. Valley Grove N. E.
20	Okfuskee	1	11 N	7 E				4,235	Pen	Hunton	J. E. Crosbie	200						Disc. Bank N. W.
21	Pottawatomie	10	10 N	4 E				5,527	Permian	Wilcox	Gulf Coast & Western	76						Disc. Masson S.W.
22	Pottawatomie	31	9 N	3 E				5,025	Permian	Hunton	Cities Service	43						Disc. Morvin W.
23	Pottawatomie	26	8 N	2 E				5,646	Permian	2nd Wilcox	Smith Bros.							Abd.
24	Pottawatomie	26	11 N	2 E				5,813	Permian	Wilcox	L. Jackson							Abd.
25	Pottawatomie	30	6 N	3 E				3,130	Permian	Layton	Bert Axton	35						Disc. Wanette, E.
26	Pottawatomie	26	11 N	4 E				5,578	Permian	Unconformative Sand	Ilvon O. I.	13						Disc. Red Hill Abd. Sept. 1949
27	Pottawatomie	9	8 N	2 E				5,205 PBD	Permian	Hunton	Derby Oil	15						Disc. Burnett N.W.
28	Pottawatomie	12	11 N	4 E				4,978	Permian	Base, Pen, Miss	Sterling Oil							Abd.
29	Pottawatomie	23	7 N	2 E				5,750	Permian	Wilcox	H. N. Pardee							Abd.
30	Pottawatomie	3	11 N	5 E				4,881	Permian	2nd Wilcox	Standard Seismograph							Abd.
31	Pottawatomie	28	10 N	4 E				5,361	Permian	2nd Wilcox	Altus Drilling							Abd.

CONTINUED NEXT PAGE

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG.-/END 1949		GRAVITY A.P.I.-	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. NET	STRUCTURE[l]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
185	40	3			36					41		S		1,337	10	A		
186	5				4					36		S-L		4,300	15	A-F		
187	51	3	7		34									3,981	10	A		
												S		3,164	70	/		
188	33		1		17					38		L		3,873	78	A		
												S		4,148	20	\		
														3,445			Booch	
189	1	1			1					40		S		4,000	15	A		
190	4				4													
												S		1,900	x	M.C.		
191	11	3			11													
192		7	1		17													

* Stratigraphic

TABLE 2 – CONTINUED SUMMARY OF DRILLING OPERATIONS IN SEMINOLE AREA, OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC.	TWP.	RGE.	TOTAL DEPTH FT. OR METER	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL BBL.	GAS M CU. FT.	CASINGHEAD GASOLINE U.S. GAL.	CRACKING OR ACID	PRESSURE LB. PER SQ. IN. CASING	TUBING	REMARKS
		SURVEY	LAT.	LONG.											
32	Pottawatomie	10	10 N	2 E	6,311	Permian	2nd Wilcox	C. A. Palmer							Abd.
33	Pottawatomie	10	10 N	2 E	6,028	Permian	2nd Wilcox	N. Barrett							Abd.
34	Pottawatomie	34	10 N	2 E	6,018	Permian	2nd Wilcox	Blackwell O & G							Abd.
35	Pottawatomie	6	8 N	4 E	5,147	Permian	2nd Wilcox	MacMillian							Abd.
36	Pottawatomie	16	11 N	6 E	4,756	Penn	Hunton	Sterling Oil of Okla. Inc.							Disc. Unnamed Pool
37	Pottawatomie	9	11 N	6 E	4,890	Penn	2nd Wilcox	Sterling Oil Co.	5						Abd.
38	Pottawatomie	13	11 N	5 E	4,823	Permian	Hooch	B. B. Blair, et al.							Disc. Seminole Lake N.
39	Seminole	35	9 N	7 E	3,445	Penn	Calvin	Cumming-McIntyre	35						Disc. Seminole Lake NE.
40	Seminole	32	9 N	8 E	1,867	Penn	Sand	Murphey Oil	102						Disc. Prog N W
41	Seminole	31	5 N	6 E	1,836	Penn	Wilcox	Delaney, et al.		8					Abd.
42	Seminole	36	11 N	7 E	4,316	Penn	1st Wilcox	J. E. Crosbie							Abd.
43	Seminole	34	11 N	5 E	4,787	Permian	2nd Wilcox	G. R. Bays							Abd.
44	Seminole	33	11 N	6 E	4,700	Penn	Union Valley	Anderson-Prichard							Disc. Sylvan E
45	Seminole	12	10 N	7 E	3,617	Penn	2nd Wilcox	Sun A. King	45	.2					Abd.
46	Seminole	27	9 N	8 E	4,421	Penn	2nd Wilcox	Gulf Oil							Abd.
47	Seminole	34	7 N	5 E	4,320	Permian	2nd Wilcox	Crawford Carter							Abd.
48	Seminole	16	11 N	8 E	3,688	Penn	Cromwell	Ligon & Sons							Abd.
49	Seminole	36	6 N	5 E	3,375	Permian	Dolomite	Wingate Est., et al.							Abd.
50	Seminole	26	7 N	7 E	1,756	Penn	L. Calvin	Ashland O & R	15	.2		24/64			Disc. Transco E
51	Seminole	35	10 N	6 E	2,700	Penn	L. Calvin	K.S.P. Prod. Co.							Abd.
52	Seminole	15	11 N	8 E	3,581	Penn	Cromwell	B. Deardorf							Abd.
53	Seminole	16	7 N	7 E	2,284	Penn	Senora	Keener O & G							Abd.
54	Seminole	12	5 N	5 E	2,836	Permian	Shale	Keener Oil & Gas	102			24/64			Disc. Transco N W
55	Seminole	20	7 N	7 E	1,784	Penn	L. Calvin	Porter O & G							D & A
56	Seminole	8	10 N	7 E	3,911	Penn	Mississippi	J. E. Crosbie							Abd.
57	Seminole	25	8 N	5 E	4,485	Permian	Sylvan	Kanowa Oper. Co.							Abd.
58	Seminole	4	9 N	8 E	3,582	Penn	Calcareous	Frank Marta							Abd.
59	Seminole	10	6 N	7 E	4,428	Penn	Wilcox								

	IN PROVEN FIELDS	WILDCATS
Number of wells drilling Dec. 31, 1949	646	80
Number of wells completed during 1949	28	2
Number of gas wells completed during 1949	188	63
Number of dry holes completed during 1949		

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[C] TO END OF 1949	MILLION CU FT[C] DURING 1949		TO END OF 1949	DURING 1949
	McIntosh											
1	Hoffman	Dutcher, Pen	1917	300	x	365						
2		Wilcox, * Ord										
3			1941	10	85	0						
	Muskogee											
4	Beland	Boynton, * Pen										
5		1st Dutcher, Pen	1906	300	x	3,285						
6		2nd Dutcher, Pen										
7	Boyle	Dutcher, Pen	1927	230	x	0						
8	Boynton	Leidecker, Pen	1914	2,740	x	14,965						
9		Boynton, * Pen										
10	Butler	Unidentified, Pen	1918	1,500	x	41,630						
11	Cole	Unidentified, Pen	1914	780	x	2,920						
12	Council Hill	Dutcher, Pen	1919	335	x	14,235						
13	Haskell	Dutcher, Pen	1915	1,750	x	18,980						
14	Jolly Patton	Unidentified, Pen	1938									
15		Muskogee, Pen	1930	260	x	4,015						
16		Timber Ridge, Pen	1926									
17	Link	Booch, Pen										
18		Dutcher, Pen	1909	715	x	54,030						
19		Unidentified										
20	Muskogee	Muskogee, Pen 1894-	1904	3,760	x	50,370						
21	Muskogee (North)	Wilcox, Ord	1906	250	x	4,380						
22	Robinson	Unidentified (Gas) Pen	1915	280	x	1,825						
23		Muskogee, Pen										
24	Sheppard	Unidentified, Pen	1917	140	x	30,075						
25	Somerville	Dutcher, Pen	1926	10	x	0						
26	Transcontinental	Dutcher, Pen	1918	215	x	1,440						
27	Transcontinental (East)			40	x	0						
28	Yahola	Booch, Pen	1918	680	x	1,905						
29		Boynton, Pen										
30	Miscellaneous	Dutcher, * Pen										
31		1st Wilcox, Ord	Various	820	x	3,650						
32		2nd Wilcox, Ord										
	Pittsburg											
33	Alabama (West)	Calvin (Gas) Pen	1946	40	35,425	10,585						
34		Booch, Pen										
35	Baltimore (North)	Deaner, * Pen										
36		Hunton, * Sil-Dev	1930-1922	525	x	5,475						
37		1st Wilcox, Ord										
38		2nd Wilcox, Ord										
39	Bearden	Booch, Pen										
40		Calcrease, Pen	1924		x	0						
41		Dutcher, Pen										
42	Bearden (East)	Hunton, Sil-Dev	1949		4,752	4,752						
43	Bierdeman	Wilcox, Ord	1930	100	298,109	2,930						
44	Blakely	Unidentified	1923	140	971,265	3,285						
45	Blakely (North)	Booch, Pen	1945	100	38,422	12,045						
46	Blakely (Southeast)	Wilcox, Ord	1949		69,190	69,190						
47	Cary	Various Pen	1928	485	1,306,045	17,520						
48	Clearview	Wilcox, Ord	1927	240	x	7,300						
49	Clearview (Northwest)	Calcrease, Pen	1942	40	24,576	11,680						
50	Coson	Hunton, Sil-Dev	1940	80	30,442	11,680						
51	Deaner	Deaner, Pen	1930	1,460	x	38,690						
52	Deaner (North)		1949		775	775						
53	Fields	Deaner, Pen	1918	440	x	7,300						
54		Wilcox, Ord										
55	Garden Grove	Prue, Pen	1946	420	1,391,923	246,375						
56	Garden Grove, (North)	Hunton, Sil-Dev	1948		17,958	7,665						
57	Gregory	Various, Pen, Ord	1922	390	x	8,395						
58	Gypsy Hill	Dutcher, Pen	1910	1,600	x	7,665						
59		Wilcox, Ord										
60	Haydenville	Dutcher, Pen	1938	240	189,060	8,030						
61		Wilcox, Ord										
62	Haydenville (South)	Calcrease, Pen	1948		47,588	27,740						
63	Josey	Deaner (Gas) Pen										
64		Lyons, Pen	1923	525	x	44,165						
65		Wilcox, Ord										
66	Keaton	Dutcher, Quin, Pen	1919	210	x	0						
67	Lyons-Quinn	Deaner, Pen	1921	1,645	x	35,040						
68		Lyons, * Pen										
69	Vinson	Hunton, Sil-Dev	1948	10	8,515	0						
70	Wiseaver	Wheeler, Pen	1928	160	x	2,555						
71		Dutcher, Pen										
72	Wiseaver (Southeast)	Dutcher (Gas) Pen	1947	160	112,598	16,060						
73		Cromwell, Pen										
74	Wiseaver (Southwest)	Dutcher, Pen	1948		4,551	3,650						
75	Wishest	Hunton, Sil-Dev	1942	90	185,496	5,840						
76	Morgan	Dutcher, Pen	1923	140	x	0						
77	Morse	Cromwell, Pen										
78		Calcrease, Pen	1944		133,851	25,915						
79		Hunton, Sil-Dev										
80	Morse (Northeast)	Calcrease, Pen	1948		10,926	4,475						
81	Morse (Northwest)	Calcrease, Pen	1949		15,258	15,258						
82	Okemah	Deaner, Pen	1921	1,050	x	62,050						
83	Okemah (East)	L. Cromwell, Pen	1940	240	572,761	21,900						

* Most important producing formation.

LINE NUMBER	NUMBER OF WELLS[4]			WELLS PRODUCING[5] DEC. 1949		RESERVOIR PRESSURE LB PER SQ. IN.		SECONDARY RECOVERY[6]	CHARACTER OF OIL[8]		PRODUCING FORMATION					DEEPEST ZONE TESTED[9] TO END OF 1949	
	COMPLETED TO END 1949	1949				INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[7]	POROSITY PER CENT	DEPTH TO TOP OF PRODUCING ZONE FT.[8]	THICKNESS PROD. FT. AVG. FT. NET	STRUCTURE[8]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED														
1				1					35		S	P	1,780	10	D	Wilcox	
2											S	P	2,900	50			
3				Abd.					40								
4				9					35		S	P	1,360			Siliceous	
5											S	P	1,650				
6				4					38		S	P	1,700				
7				18					35		S	P	1,617				
8			4								S	P	1,385	15	D		
9				46					32		S	P	1,530	25			
10				10				G	35		S	P	1,215	47			
11			2	30				G	38		S	P	1,610	20			
12				63				G	34		S	P	1,650		T		
13			4								S	P	1,400				
14				19					43		S	P	500	20			
15											S	P	675	12	A		
16											S	P	700	10			
17				32				G	36		S	P	1,075				
18								G	38		S	P	1,440				
19				113				G	35		S	P	2,044			Wilcox	
20				20					41		S	P	1,050				
21				2							S	P	1,080	28	A		
22									39		S	P	1,325				
23		1		4							S	P	1,940	30			
24				Abd.					39		S	P	1,440	11	A	Arbuckle	
25				7							S	P	1,863	15			
26			1	2					39		S	P	1,220	50	A		
27				18							S	P	1,330	30			
28											S	P					
29									38		S	P					
30				4							S	P					
31											S	P					
32									36		S	P	1,095			Cromwell	3,155
33		1		4							S	P	2,262	2			
34											S	P	2,470	40			
35									38		L	P	3,395	30			
36			1	6							S	P					
37											S	P					
38											S	P	2,850				
39											S	P	3,025				
40				Abd.							S	P	3,230				
41											L	P	3,783				
42		1		1					38		S	P					
43				3					39		S	P					2,540
44			2	2					30		S	P	2,498	12			
45				3					42		S	P	3,752				
46		8		8					32		S	P					
47		2		13					38		S	P	3,650				
48			1	7					39		S	P	2,915	10			
49				3					42		L	P					
50		3		5					38		S	P	2,800	40			
51		1	29	41					43		S	P					
52				1					43		S	P					
53			1	9							S	P					
54									38		S	P	2,900	36		Ohanton	4,361
55			2	69					42		L	P	4,398		A		
56		1		2					39							Wilcox	
57			2	10					33		S	P	2,430	10			
58		2		11							S	P	3,290	5			
59									31		S	P					
60				4							S	P					
61											S	P	2,820				
62		1		4							S	P	2,735	80			
63									46		S	P	2,980	50	D	Wilcox	3,700
64				16							S	P	3,600	50			
65				Abd.					39						D	Wilcox	
66				21					39		S	P	1,820				
67											S	P	2,600				
68				Abd.					39		L	P					
69				1					39		L	P	2,430	10			
70											S	P	3,470	50			
71				4					37		S	P		10		Wilcox	4,724
72											S	P	3,550	5			
73				2							S	P	3,456				
74		1		5					36		L	P	3,692	4			
75				Abd.					37		S	P					
76				18					37		S	P	3,175	20			
77		1									L	P	3,122	19			
78				1					38		S	P	3,668	9			
79				2							S	P	2,958				
80		2		54					30		S	P	2,884				
81				9					37		S	P	2,970	70	A	Wilcox	
82																	
83			1														

* Stanolind Oil and Gas Company, Tulsa, Oklahoma. Member AIME

TABLE I – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION (Thousands of Bbl)	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
84	Asmah (North)	Gilcrease, Pen	1941	160	367,322	20,075						
85		Hunton, Sil-Dev	1942									
86	Asmah (West)	Hunton, Sil-Dev	1941	60	53,199	365						
87	Bellmore	Dutcher, Pen	1917	100	176,171	5,475						
88		Wilcox, Ord	1938									
89	Boden	Prue, Pen										
90		Bartlesville, * Pen	1914		x	5,110						
91		Dutcher, Pen										
92	Boden (North)	Cromwell, Pen	1944	40	5,083	0						
93	Boden (South)	Cromwell, Pen	1945	120	302,767	19,730						
94	Bettigush	Red Fork, Pen	1944	300	136,191	11,315						
95		Hunton (gas), Sil-Dev										
96	Bettigush (Southeast)	Prue (gas), Pen	1946	120	4,233	730						
97	Boatswald	Cromwell, Pen	1940		42,649	42,649						
98	Sheldon	Wilcox, Ord	1916	900	x	45,990						
99	Beleetka	Gilcrease, Pen	1913	1,845	x	89,060						
100	Beleetka (South)	L. Gilcrease, Pen	1937	90	63,944	0						
101	Beleetka (West)	Booch, Pen	1926	250	1,379,040	73,000						
102	Belty (Southwest)		1948	x	17,624	14,600						
103	Miscellaneous	Various Pen, Ord		x	x	64,240						
	(Lincoln)											
104	Aztec	Booch, Pen										
105		Deaner, Pen	1917	2,140	x	30,295						
106		Wilcox, Ord										
107	Bald Hill	Glenn, Pen										
108		Booch, * Pen										
109		Red Fork, Pen	1908	25,095	x	207,685						
110		Morris, Pen										
111		Dutcher, Pen										
112		Wilcox, * Ord										
113	Beota-Bapp		1920		x	0						
114	Briggs (North)	Youngstown, Pen	1909	1,840	x	7,665						
115		Wilcox, Ord										
116	Briggs (South)	Various Pen, Miss, Ord	1911	4,455	x	70,445						
117	Brinton	Booch, Pen										
118		Glenn, Pen	1915									
119		Lyons-Quinn, Pen		545	x	5,840						
120		Wilcox, Ord	1918									
121	Coulton	Booch, Pen										
122		Dutcher, Pen	1907	2,040	x	17,155						
123		Wilcox, Ord										
124	Edna (East)	Unidentified, Pen	1919	150	x	2,190						
125	Erne	Dutcher, Pen	1921	600	x	1,825						
126		Wilcox, * Ord										
127	Capey Hill (Northeast)	Wilcox, Ord	1938	100	79,462	0						
128	Hamilton Switch	Glenn, Pen										
129		Dutcher, Pen	1909	2,570	x	16,060						
130		Wilcox, Ord										
131	Hector	Dutcher, Pen										
132		Mississippi, Mis	1914	645	x	2,920						
133		Wilcox, Ord										
134	Henrietta	Various, Pen, Sil-Dev	1910	785	x	5,475						
135		Ord, Cam										
136	Henrietta (Northeast)				x	4,015						
137	Montezuma	Unidentified	1918	220	x	1,095						
138	Morris	U. Booch, Pen										
139		L. Booch, Pen										
140		Morris, Pen	1907	7,300	x	98,915						
141		Fields, Pen										
142		Lyons-Quinn, Pen										
143		Wilcox, Ord										
144	Nature	U. Dutcher, Pen	1916	1,750	x	8,030						
145		Wilcox, Ord										
146	Nuyaka (South)	Wilcox, Ord	1937	105	578,803	4,380						
147	Nuyaka (Southwest)	Misener, Mis	1939	40	33,940	0						
148	Oklahoma Central	Glenn, Pen										
149		Taneha, Pen										
150		Dutcher, * Pen	1921	545	x	16,425						
151		Wilcox, * Ord										
152	Okmulgee	Bartlesville, Pen										
153		Booch, Pen										
154		Dutcher, * Pen	1906	5,020	x	89,055						
155		Wilcox (Gas), Ord										
156	Phillipsville	Dutcher, Ord	1920	580	x	5,110						
157		Wilcox, * Ord										
158	Pine	Booch, Pen	1915	815	x	6,205						
159		Dutcher, Pen										
160	Polivana	Glenn, Pen										
161		Taneha, Pen	1915	3,975	x	62,050						
162		Wilcox, Ord										
163	Schuster	Red Fork (Gas), Pen										
164		Glenn, * Pen										
165		Booch (Gas), Pen	1907	455	x	4,380						
166		Deaner, Pen										
167		Wilcox, Ord										

* Most important producing formation.

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[b] DEC. 1949		RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[c]	CHARACTER OF OIL[d]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED			INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[e]	POROSITY PER CENT[f]	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
84					8				42		S	P					
85											L	P	3,916	44			
86					1				44		S	P	2,660	90		Wilcox	
87					5				39		S	P	1,360				
88											S	P	2,790	10			
89											S	P	2,840	200	T	Wilcox	4,515
90					4				36		S	P	3,790	10			
91											S	P	3,725			2nd Wilcox	4,557
92					Abd.				30		S	P	3,870	30		2nd Wilcox	4,751
93			1		8				38		S	P	3,190	15		2nd Wilcox	4,191
94			3		6						L	P	4,014	11			
95					2												
96			1		3				38		S	P	3,440				
97			3		17				42		S	P					
98		2			61				39		S	P	2,580	30			
99			7		2				39		S						
100					15				41		S	P					
101					1												
102					28				36								
103		1	3														
104									38		S	P					
105			10		30						S	P					
106											S	P	750				
107											S	P	1,200	40			
108								C	30		S	P	1,300		A	Turkey Mtn.	
109			13		545						S	P	1,575				
110											S	P	1,700				
111											S	P	2,250				
112																	
113					Abd.				38		S	P					
114			1		16						S	P					
115									37		S	P					
116					37						S	P	1,700	20			
117											S	P	2,100	65	D	Wilcox	
118									37		S	P					
119					12						S	P	2,700	20			
120											S	P	1,300				
121									30		S	P	1,930		A F	Wilcox	
122					49						S	P	2,835				
123									30		S	P					
124					2				40		S	P	1,900	15	D	Wilcox	
125			11		1						S	P	2,700	10			
126											S	P	3,250	10	D	Wilcox	
127					Abd.						S	P	1,385				
128									29		S	P	2,020	20	D	Wilcox	
129			6		9						S	P	2,700	30			
130											S	P	1,715	3			
131									37		L	P	1,860	70		Wilcox	
132			6		2						S	P	2,240	30			
133									38		S	P				Arb.	
134			17		10						L	P					
135					4												
136					4				38		S	P					
137											S	P	1,200	20			
138											S	P	1,800	25			
139									36		S	P	1,600	20	A	Turkey Mtn.	
140			1		168						S	P	1,800	10			
141											S	P	2,000	25			
142											S	P	2,450	45			
143									30		S	P	1,730	10	A	Wilcox	
144					19						S	P	2,755	10			
145					5				43		S	P					
146					1						S	P	3,166	8			
147			1								S	P	1,800	12			
148											S	P	2,090	15			
149					/				32		S	P	2,500	35	D	Wilcox	
150											S	P	3,010	12			
151											S	P	1,240				
152											S	P	2,000	10			
153									30		S	P	2,900		T	Wilcox	
154			12		128						S	P	2,750	100			
155									45		S	P	2,250	30	D	Wilcox	
156					8						S	P	2,750	40			
157					19				35		S	P					
158											S	P					
159											S	P	1,840	40			
160									34		S	P	2,285	20		Turkey Mtn.	
161			11		149						S	P	2,830	10			
162											S	P	1,530	30			
163											S	P	1,960	40			
164									36		S	P	2,015	30		Wilcox	
165			2		7						S	P	2,290	20			
166											S	P	2,945	5			
167																	

TABLE 1 – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
168	Simmons-Black	Salt, Pen	1920	455	x	11,315						
169		Booch, Pen										
170	Spencer	Red Fork, Pen										
171		Dutcher, * Pen	1917	790	x	71,175						
172		Misener, Mis										
173		Wilcox, Ord										
174	Sumners	Dutcher, Pen	1914	290	x	4,015						
175	Tiger Flats	Glenn, Pen										
176		Booch, * Pen										
177		Deaner, * Pen	1914	1,045	x	4,380						
178		Lyons, * Pen										
179		Wilcox, Ord										
180	Youngstown	Glenn, Pen										
181		Youngstown, * Pen	1915	2,235	x	19,345						
182		Dutcher, * Pen										
183		Wilcox, Ord										
184	Miscellaneous	Various, Pen, Ord			x	2,920						
	Tulsa											
185	Airport	Bartlesville, Pen	1937	330	151,118	1,460						
186	Alsuma	Burgess, Pen	1916	850	x	2,190						
187	Bird Creek	Oswego, Pen										
188		Bartlesville, * Pen	1906	17,910	x	275,940						
189		Burgess, * Pen										
190	Bixby	Glenn, Pen										
191		Tanaha, Pen										
192		Dutcher, Pen	1914	1,860	x	24,820						
193		Mississippi, Mis										
194		Wilcox, Ord										
195	Broken Arrow	Bartlesville, * Pen										
196		Tucker (Gas), Pen	1901	3,665	x	6,570						
197		Dutcher, Pen										
198		Burgess, Pen										
199	Bruner-Vern	Burgess, Pen										
200		Tyner, * Ord	1912	1923	1,055	x	25,915					
201		Turkey Mtn, * Cam										
202	Collinsville	Oswego, Pen										
203		Bartlesville, * Pen	1911	120	x	4,380						
204		Burgess, Pen										
205	Dawson	Bartlesville, Pen	1906	765	x	6,935						
206	Fisher	Bartlesville, (Gas) Pen										
207		Tanaha (Gas), Pen										
208		Burgess (Gas), Pen	1918	685	x	2,920						
209		Tyner, Ord										
210		Turkey Mtn, * Cam										
211	Jenks	Red Fork, Pen										
212		Bartlesville, * Pen	1901	6,885	x	61,320						
213		Dutcher, * Pen										
214		Mississippa, Mis										
215	Leonard	Layton, Pen										
216		Oswego (Gas), Pen										
217		Red Fork, Pen	1916	1,000	x	10,950						
218		Bartlesville, * Pen										
219		Tyner, * Ord										
220	Owasso	Oswego (Gas), Pen										
221		Red Fork (Gas), Pen										
222		Bartlesville, * Pen	1913	360	x	7,300						
223		Burgess, * Pen										
224		Tyner (Gas), Ord										
225	Perryman	Unidentified, Pen	1924	345	x	1,095						
226	Red Fork	Oswego, Pen										
227		Red Fork, Pen	1901	4,390	x	14,965						
228		Turkey Mtn., Cam										
229	Sand Springs	Oswego, Pen										
230		Red Fork (Gas), Pen										
231		Tucker, Pen										
232		Burgess (Gas), Pen	1916	625	x	12,775						
233		Wilcox (Gas), Ord										
234		Tyner (Gas), Ord										
235		Siliceous, Cam										
236	Tulsa	Perryman, * Pen										
237		Red Fork, Pen										
238		Bartlesville, * Pen	1901	910	x	0						
239		Dutcher (Gas), Pen										
240		Wilcox, * Ord										
241	Turkey Mountain	Big Lime, Pen										
242		Oswego, Pen										
243		Red Fork, Pen										
244		Glenn, Pen	1922	1,115	x	30,805						
245		Tanaha (Gas), Pen										
246		Wilcox, * Ord										
247		Turkey Mtn, * Cam										
248	Burley	Bartlesville, Pen										
249		Burgess (Gas), Pen	1914	3,715	x	63,145						
250		Siliceous, * Cam										

* Most important producing formation.

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949	RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED		INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
168			1	7				36		S	P					
169										S	P	1,825	20			
170										S	P	1,310	100		Turkey Mtn.	
171		2		48						S	P	1,580				
172										S	P	1,660				
173								38		S						
174		2		14						S	P	1,315	35			
175										S	P	1,900	25			
176								37		S	P	2,300	100		Wilcox	
177		1		2						S	P	2,590	110			
178										S	P	3,680				
179										S	P	1,860	60			
180								31		S	P	2,250	50	A	Wilcox	
181		1		38						S	P	2,400	60			
182										S	P	3,000				
183				5				38								
184			2							S	P					
			2	4				38								
185				4				35		S	P					
186										L	P	790	55			
187										S	P	1,110	95	A	Wilcox	
188			39	1,044			G B	31		S	P	1,345	20			
189										S	P	965	50			
190										S	P	1,192	65			
191				50				32		S	P	1,700	70		Turkey Mtn.	
192										L	P	1,850	25			
193										S	P	2,110	30			
194										S	P	1,350	20			
195								37		S	P	1,430	5	A	Turkey Mtn.	
196			16	23						S	P	1,500	15			
197										S	P	2,080	5			
198										S	P	1,580	16			
199								37		S	P	1,930	22	A	Turkey Mtn.	
200			7	38						D	P	2,020				
201										L	P	700	30			
202								33		S	P	1,390	175	T	Siliceous	
203				8						S	P	1,600	30			
204								36		S	P	850	20			
205				40						S	P	1,675	25			
206										S	P	1,725	75			
207								34		S	P	1,980	30	A	Turkey Mtn.	
208				3						S	P	2,365	10			
209										S	P	2,400	100			
210										S	P	1,400	20			
211								36		S	P	1,600	40		Siliceous	
212			28	169			G			S	P	1,750	60			
213										S	P	1,800				
214										S	P	1,220	10			
215										L	P	1,365	5			
216								35		S	P	1,430	20	S L	Siliceous	
217			6	17						S	P	1,500	22			
218										S	P	2,100				
219										L	P	590	10			
220										S	P	960	50			
221								30		S	P	1,170	30		Siliceous	
222				14						S	P	1,340	40			
223										S	P	1,730	20			
224							G	31		S						
225			10	1						L	P	599	30			
226								34		S	P	1,275	25	A	Turkey Mtn.	
227			3	61						S	P	2,160	15			
228										L	P	1,100	35			
229										S	P	1,435	10			
230										S	P	1,750	15			
231								37		S	P	1,860	10	A	Siliceous	
232			2	22						S	P	1,940	60			
233										S	P	2,025	20			
234										D	P	2,177	10			
235										S	P	1,086	10			
236										S	P	1,300	90			
237				Abd.				34		S	P	1,446	50		Wilcox	
238										S	P	1,700	50			
239										S	P	1,990	30			
240										L	P	490				
241										L	P	730	20			
242										S	P	1,390	10			
243								36		S	P	1,430	70	D	Turkey Mtn.	
244			6	26						S	P	1,600	30			
245										S	P	2,050	30			
246										D	P	2,150	30			
247										S	P	1,280	40			
248								32		S	P	1,600	25		Siliceous	
249			11	263						S	P	1,945	20			
250																

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL OKLAHOMA IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU. FT.[c] TO END OF 1949	MILLION CU. FT.[c] DURING 1949		TO END OF 1949	DURING 1949
251	Barey	Glenn, Pen										
252		Tuttle, Pen	1915	2,300	x	74,825						
253		Dutcher, Pen										
	Bigheart											
254	Bixby	Dutcher, Pen	1918	260	x	730						
255		Burgess, Pen			x							
256	Comanche Hills	Muskogee, Pen	1949		12,758	12,758						
257	Corine	Unidentified	1919	190	x	0						
258	Coweta	Dutcher, Pen										
259		Mississippi (Gas) Mis	1914	720	x	5,475						
260		Burgen, Ord										
261	George	Dutcher, Pen	1918	270	x	4,015						
262	Gilliette	Dutcher (Gas), Pen	1924	65	x	0						
263		Tyner, Ord										
264	Gokie	Dutcher, Pen	1916	325	x	6,205						
265	Johnson-Bailey	Unidentified	1920	80	x	0						
266	McCracken	Tyner, Ord	1920	90	x	0						
267	Oak Grove	Pitkin, Mis										
268		Chattanooga (Gas), Dev										
269		Tyner (Gas), Ord	1920	145	x	0						
270		Burgen, Ord										
271	O. K.	Dutcher, Pen										
272		Tyner, Ord	1919	80	x	0						
273		Burgen, Ord										
274	Oneta	Dutcher, Pen										
275		Mississippi, Mis	1916	695	x	16,790						
276		Tyner, Ord										
277	Seltzer	Dutcher, Pen	1924	65	x	0						
278	Stone Bluff	Various, Pen, Mis, Ord	1915	1,065	x	98,187						
279	Striker	Dutcher, Pen	1917		x	0						
280		Morrow-Pitkin, Mis										
281	Wagoner	Dutcher, Pen										
282		Wilcox (gas), Ord										
283		Tyner, Ord	1914	460	x	0						
284		Burgen (Gas), Ord										
285	Wagoner, South	Unidentified, Pen	1939	80	x	0						
286	Webster	Mississippi, Mis	1917	60	x	0						
287		Burgen, Ord										
288	Wright	Pitkin, Mis	x	80	x	0						
289	Miscellaneous	Various		170	x	41,975						
290												
291	Aggregate for district of pools marked x				325,976,006							
292												
293	Total East Central Oklahoma				332,779,490	2,910,622						

[a] Most important producing formation.

TABLE 2 - SUMMARY OF DRILLING OPERATIONS FOR EAST CENTRAL OKLAHOMA

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC.	TWP. N or S	RGE. E or W	TOTAL DEPTH FT. OR METER	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	IMPORTANT WILDCATS DRILLED IN 1949 INITIAL PRODUCTION PER DAY OIL BBL.	GAS M CU. FT.	CONDENSATE BBL.	CASING PRESS. OR GAS VOL. IN M CU. FT.	PRESSURE LB. PER SQ. IN. CASING	TUBING	REMARKS
1	Okfuskee	14	10 N	9 E	3,827	Pennsylvanian	Hunton Lime	Mohawk Drlg. Co	34				Nat	4-49	New Disc. 4-49
2	Okfuskee	1	11 N	7 E	4,259	Pennsylvanian	Hunton Lime	Crosbie, Inc.	287				Nat	11-49	New Disc. 11-49
3	Okfuskee	6	11 N	11 E	3,760	Pennsylvanian	Wilcox Sand	Mid-Cont. Pet. Co	60				Nat	7-49	New Disc. 7-49
4	Okfuskee	30	13 N	9 E	4,120	Pennsylvanian	Dutcher	Armer & Cullinan	30				Nat	10-49	New Disc. 10-49 42 Gravity Oil
5	Okfuskee	31	13 N	10 E	2,898	Pennsylvanian	Gilcrease Sand	Portable Drlg.	9	7			Nat	2-49	New Disc. 2-49 37 Gravity Oil
6	Okfuskee	14	13 N	8 E	3,445	Pennsylvanian	Cromwell Sand	Baldock, E.T. et al	10				Nat	6-49	New Disc. 6-49 38 Gravity Oil
7	Wagoner	12	16 N	14 E	1,600	Pennsylvanian	Muskogee Sd.	Mid-Cont. Petr.	90				Nat		New Disc. 6-49

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED				INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT./WT.	STRUCTURE[k]	NAME	DEPTH OF HOLE, FT.
250																		
251		1			64					37		S	P	1,480	60		Wilcox	
252												S	P	1,650	50			
253												S	P	1,950	50			
254			1		3					35		S	P					
255												S	P					
256		3			3					39		S	P					
257					7							S	P	700				
258					17					38		L	P	1,300		D F	Turkey Mtn.	
259												S	P	1,200				
260										36		S	P					
261			9		10					38		S	P	850		D F	Harper	
262					3							S	P	1,300				
263										37		S	P					
264			3		9					33		S	P					
265					Abd.					43		S	P					
266					8							L	P	785	30			
267												S H	P	900	15			
268					Abd.					33		S	P	1,100	20			
269												S	P	1,190	4			
270												S	P	550	60			
271					Abd.					36		S	P	800	170	D		
272												S	P	1,070	10			
273												S	P	1,000				
274										38		S	P	1,380				
275			3		40							S	P	1,700				
276					7					37		S	P	800	20			
277			13		132					35		S	P	1,420				
278					Abd.							S	P	450	25			
279												L	P	915	10			
280												S	P	300				
281												S	P	750	10			
282										35		S	P	400				
283					43							S	P	1,094	30			
284										35		S	P					
285					10					33		S	P	1,100	30			
286					Abd.							S	P	1,160	30			
287												L	P					
288			1		Abd.					32		S L	P					
289			7		Abd.													
290																		
291																		
292																		
293					4,423													

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL CREEK COUNTY, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
1	Arno	Simpson, Ord	1923	210		15,529						
2	Arno (Southeast)	Skinner, Pen	1939	110	118,742	13,582						
3	Arno (West)	Prue, Pen										
4		Red Fork, Pen	1940	225	225,925	13,440						
5		Wilcox, Pen										
6	Bellview (South)	Red Fork, Pen	1941	60	196,775	9,823						
7	Big Pond	Prue, Pen	1924	470	x	101,496						
8		Wilcox, Ord										
9	Bowden	Bartlesville, Pen										
10		Bluch, Pen	1906	3,495	x	91,128						
11		Dutcher, Pen										
12		Wilcox, Ord										
13	Bristow	Ft. Scott (gas), Pen										
14		Bartlesville (gas), Pen										
15		Dutcher, * Pen	1916	5,255	x	203,424						
16		Mississippi, Mis										
17		Wilcox, Ord										
18	Bristow (North)	Same as Bristow	1922	1,700	x	46,548						
19	Bristow (West)	Dutcher, Pen	1922	565	x	14,208						
20		Wilcox, Ord										
21	Bruce	Wilcox, Ord	1926	515	x	24,408						
22	Bruce (East)	Layton, Pen	1939	100	x	4,308						
23	Cushing	Layton, Pen										
24		Jones, Pen										
25		Wheeler, Pen										
26		Skinner, Pen	1912	24,940	382,311,815	2,749,884						
27		Red Fork, Pen										
28		Bartlesville, * Pen										
29		Wilcox (Tucker),* Ord										
30		Arbuckle, * Ord										
31	Deep Fork	Prue, Pen										
32		Dutcher, Pen	1920	3,345	x	100,992						
33		Wilcox, Ord										
34	Depew	Bartlesville, Pen										
35		Dutcher, Pen	1915									
36		Simpson, Ord	1941	1,425	x	306,598						
37		Wilcox, Ord										
38	Depew (West)	1st Wilcox, Ord	1934	30	x	6,930						
39	Donnelly	Glenn (gas), Pen										
40		Dutcher, Pen	1924	730	x	68,220						
41		Misener, Mis										
42		Wilcox, Ord										
43	Edna	Wilcox, Ord	1940	90	146,307	6,012						
44	Glenn	Big Lime (gas), Pen										
45		Oswego, Pen										
46		Perryman, Pen										
47		Red Fork, Pen										
48		Glenn, * Pen	1906	15,970	238,542,636	2,598,171						
49		Tuscha, Pen										
50		Mississippi (gas), Mis										
51		Wilcox (Mounds),*Ord										
52		Turkey Mountain, Ord										
53	Hickory Grove	Prue, Pen	1942	220	301,864	14,827						
54		Bartlesville, Pen										
55	Independent	Dutcher, Pen	1908	1,330	x	39,900						
56		Wilcox, Ord										
57	Iron Post	Cleveland, Pen										
58		Wheeler, Pen	1917	925	x	36,573						
59		Prue, Pen										
60	Jennings (Southeast)	Skinner, Pen	1948	80	12,955	5,620						
61	Kellyville	Peru, Pen										
62		Red Fork, * Pen	1915									
63		Glenn, Pen	1934	3,400	x	101,598						
64		Dutcher, * Pen										
65		Mississippi, Mis										
66	Mannford (Deep & Shallow)	Layton, Pen										
67		Oswego, Pen	1922									
68		Skinner, Pen	1937	4,450	x	151,830						
69		Bartlesville, Pen										
70		Wilcox, Ord										
71	Mercer	Wilcox, Ord	1923	80	349,617	7,066						
72	Milfay	1st Wilcox, Ord	1941	640	1,864,972	313,154						
73		2nd Wilcox, Ord										
74	Milfay (Southeast)	Skinner, Pen	1946	20	4,450	1,066						
75	Mounds	Oswego (gas), Pen										
76		Red Fork, Pen										
77		Glenn, * Pen										
78		Tucker, Pen	1915	1,580	x	11,458						
79		Tuscha, Pen										
80		Dutcher, * Pen										
81		Wilcox, * Ord										
82	Newby	Dutcher, Pen	1929	80	x							
83	Newby (Northeast)	Skinner, Pen	1944	320	234,772	22,542						
84	Olson	Wilcox, Ord	1921	40	x	16,733						

* Most important producing zone.

LINE NUMBER	NUMBER OF WELLS[d]			WELLS PRODUCING[f] DEC. 1949	RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[i] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED		INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[j]	POROSITY PER CENT[k]	DEPTH TO TOP OF PRODUCING ZONE FT	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[l]	NAME	DEPTH OF HOLE, FT
1			3	6				38		S	P					
2		1		8						S	P	2,350				
3				6				40		S	P	2,400			Wilcox	
4		1								S	P	2,970	10			
5											P	2,756				
6		1		6				37			P	2,557				
7				29				32		S	P	3,700				
8										S	P	1,325				
9										S	P	1,650				
10			15	188				32		S	P	1,875				
11										S	P	2,300				
12										S	P	1,275	20			
13										S	P	2,300	35			
14										S	P	2,700	55		Wilcox	
15			9	104				34		L	P	2,800	20			
16										S	P	3,300				
17								35		S	P					
18			14	45				35		S	P	3,300			Wilcox	
19				8						S	P	3,650				
20			1	32				35		S	P	3,300			Wilcox	
21				9				35		S	P	1,700				
22										S	P	1,475	10			
23										S	P	1,770	25			
24										S	P	2,140	40			
25	3,731		17	1,493			G &	27-40		S	P	2,330	30	A D	PreCambrian	
26										S	P					
27										S	P	2,560	70			
28										S	P	2,960				
29										S	P					
30										S	P	2,450				
31										S	P				Wilcox	
32			2	114				42		S	P	3,350				
33										S	P	3,750				
34										S	P	2,700				
35										S	P	3,100				
36		2		73				35		D	P			A	Wilcox	
37										S	P	3,775				
38				3				36		S	P	3,900				
39										S	P	2,365	175			
40			4	80				37		S	P	2,800	20	A	Wilcox	
41										S	P	3,200	10			
42				4				35		S	P	3,300	50		Wilcox	
43										L	P	3,310				
44										S	P	695	4			
45										S	P	815	20			
46										S	P	1,000	35			
47										S	P	1,225	15			
48			38	1,719			G	34		S	P	1,350	100	A	Turkey Mtn.	
49										S	P	1,550	20			
50										L	P	1,675	200			
51										S	P		35			
52										S	P	2,350	20			
53				12				42		S	P	2,730				
54										S	P	3,120	11			
55				14				35		S	P	2,100	55	D	Wilcox	
56		1								S	P	2,550				
57										S	P	2,330				
58		1		42				41		S	P	2,420	25			
59										S	P	2,475	50			
60	5			2				37		S	P	2,611	18	A	Bartlesville (Dry)	2,865
61										S	P	1,500				
62										S	P	2,000	30			
63			11	121				30		S	P	2,150	40	A	Wilcox	
64										S	P	2,450	30			
65										L	P	2,800	40			
66										L	P	1,550	20			
67										S	P	1,750	80			
68			4	160				35		S	P	2,060		D	Wilcox	
69										S	P	2,380	10			
70										S	P	2,900	10			
71				4				42		S	P	3,740				
72				41				38		S	P	3,865	5		Wilcox	
73		3								S	P	3,890	25			
74				1				38		S	P	2,992	8		Skinner	3,001
75										L	P	900	25			
76										S	P	1,100	30			
77										S	P	1,490	170			
78			3	17				33		S	P	1,650	20		Wilcox	
79										S	P	1,850	45			
80										S	P	2,050	55			
81										S	P	2,400	30			
82				3				34		S	P	2,950				
83				16				33		S	P	2,450				
84				16				40		S	P	3,600		D	Wilcox	

* Chief Petroleum Engineer, Mid-Continent Petroleum Corporation, Tulsa, Oklahoma. Member AIME.

TABLE I – Contd. OIL AND GAS PRODUCTION STATISTICS FOR EAST CENTRAL CREEK COUNTY

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
85	Olive	Layton, Pen										
86		Wheeler (Gas), Pen										
87		Skanner, * Pen	1914	2,235	x	84,674						
88		Bartlesville, * Pen										
89		Dutcher, Pen										
90		Burgess, Pen										
91	Pickett-Prairie	Glenn, Pen										
92		Dutcher, Pen	1915	1,820	x	86,794						
93		Wilcox, Ord										
94	Poor Farm	Layton (gas), Pen										
95		Prue, * Pen										
96		Bartlesville, Pen	1930	340	x	10,284						
97		Dutcher, Pen										
98		Wilcox, Ord										
99	Red Bank	Bartlesville (gas), Pen										
100		Tucker (gas), Pen										
101		Dutcher, Pen	1930	370	x	17,388						
102		Wilcox, Ord										
103	Sapulpa	Peru (gas), Pen										
104		Perryman, Pen										
105		Glenn, * Pen										
106		Tuscha, Pen	1909	1,790	x	39,786						
107		Dutcher, * Pen										
108		Mississippi (gas), Mis										
109		Wilcox, Ord										
110	Sapulpa (South)	Booch, Pen										
111		Dutcher, Pen	1910	2,570	x	36,507						
112		Wilcox, Ord										
113	Slick	Glenn, Pen										
114		Dutcher, * Pen	1913	6,585	x	342,607						
115		Mosener, Mis										
116		Wilcox, Ord										
117	Stroud (East)	Prue, Pen	1940	440	1,064,748	28,452						
118		Wilcox, Ord										
119	Stroud (Southeast)	Prue, Pen	1943	2,000	2,404,959	115,609						
120	Tibbens	Layton										
121		Wheeler, * Pen	1924									
122		Dutcher, Pen	1943	540	x	18,756						
123		Wilcox, Ord										
124	Tushegree	Various, Pen, Ord	1924	330		337						
125	Tushegree (East)	Various, Pen, Mis, Ord	1925	540	1,643,949	43,576						
126	Walker	Various, Pen, Mis, Ord	1923	190	x	31,059						
127	Walker (West)	Bartlesville, Pen	1939	80	146,346	2,435						
128	Wilcox	Various, Pen, Ord	1919	1,375	x	82,508						
129	Miscellaneous	Various, Pen, Ord		830	x	12,337						
130	Aggregate for district of pools marked x				213,084,618							
131	Total East Central Creek County				842,635,630	8,007,172						

* Most important producing zone.

LINE NUMBER	NUMBER OF WELLS[C]			WELLS PRODUCING[F] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[E]	CHARACTER OF OIL[A]		PRODUCING FORMATION					DEEPEST ZONE TESTED[D] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED				INITIAL	AVG. / END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[I]	POROSITY PER CENT[J]	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[K]	NAME	DEPTH OF HOLE, FT.
85												S	P	1,100	15			
86		3			161					40		S	P	2,140	50	A F	Wilcox	
87												S	P	2,330	30			
88												S	P	2,560	70			
89												S	P	3,120	10			
90												S	P	3,300	10			
91												S	P	1,850	150			
92		2			33					35		S	P	2,300		A	Wilcox	
93												S	P	2,850	50			
94												S	P	1,425	40			
95												S	P	2,400	75			
96			1		9					34		S	P	2,800	60	M	Wilcox	
97												S	P	3,100				
98												S	P	3,760	60			
99												S	P					
100												S	P	2,820				
101			1		7					36		S	P	2,150	10	A F	Wilcox	
102												S	P	3,600	5			
103												S	P	875	25			
104												S	P	1,000	30			
105												S	P	1,365	40			
106			8		83					34		S	P	1,635	10	A	Turkey Mtn.	
107												S	P	1,835	10			
108												L	P					
109												S	P	2,250	5			
110												S	P	2,000				
111			2		55					36		S	P	2,300			Wilcox	
112												S	P	2,600				
113												S	P	2,350	260			
114			7		187				G R	34		S	P	2,625	45	A D	Wilcox	3,150
115												S	P	3,080	120			
116												S	P	3,140	10			
117			1		24					38-40		S	P	2,750			2nd Wilcox	
118					87					44		S	P	4,050				
119												S	P	2,875	80		Pine	2,934
120												S	P	1,200	10			
121												S	P	2,300	25			
122			1		42					14-39		S	P	3,050	10			
123												S	P	3,680	5			
124					2					38		S	P					
125			2		24					39		S L						
126			1		35					35		S L						
127					6					37		S						
128			2		40					35								
129			1		26					39								
130																		
131					5,102													

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR OSAGE COUNTY, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
1	Alweda	Bartlesville, Pen										
2		Burgess, Pen	1918	1,205	x	7,212						
3		Mississippi, Mis										
4	Apperson, Southwest	Layton, Pen	1949		1,181	1,181						
5	Atlantic	Burgess, Pen	1924	1,330	x	215,407						
6		Arbuckle, Ord, Cam *										
7	Avant	Bartlesville, Pen	1904	12,520	x	570,205						
8		Burgess, Pen										
9	Avant (West)	Bartlesville, Pen	1905	3,555	x	30,948						
10		Burgess, Pen										
11	Barbius	Wayside, Pen										
12		Bartlesville, Pen *	1919	830	x	15,552						
13		Mississippi, Mis										
14	Bandsheel	Bartlesville, Pen	1921	630	x	24,801						
15		Mississippi, Mis										
16	Barker	Various, Pen, Mis, Ord	1932	240	x	12,499						
17		Cam										
18		Perry, Pen										
19	Barnsdall	Oswego (Gas) Pen										
20		Bartlesville, Pen	1916	3,620	x	45,078						
21		Burgess (Gas) Pen										
22	Barnsdall (South)	Mississippi (Gas) Mis										
23		Bartlesville, Pen	1921	1,125	x	11,702						
24	Barnsdall (West)	Burgess, Pen										
25	Bartlesville	Bartlesville, Pen	1922	1,665	x	69,303						
26		Big Lime, Pen										
27		Perry, Pen										
28		Oswego, Pen	1904	16,335	x	11,666						
29		Skinner (Gas) Pen										
30		Bartlesville *, Pen										
31	Big Bend	Burgess (Gas) Pen										
32	Big Bend (East)	Layton, Pen	1943	440	1,328,157	140,577						
33	Big Horse	Layton, Pen	1949		3,407	3,407						
34		Bartlesville, Pen	1927	335		28,465						
35	Birch Creek	Mississippi, Mis										
36		Cleveland, Pen										
37		Bartlesville, Pen	1920	1,140	x	17,517						
38	Black Dog (West)	Burgess, Pen										
39		Arbuckle, Cam	1945	160	92,243	5,136						
40	Blackland (Northeast)	Pen	1941	120	6,201	634						
41	Boston	Elgin (Gas) Pen										
42		Cleveland, Pen	1904	770	x	80,175						
43		Bartlesville, Pen										
44		Arbuckle *, Cam										
45	Boston (East)	Burbank, Bartlesville, Pen		80	x	4,128						
46	Boston (North)	Wilcox, Ord	1921	440	401,423	8,555						
47		Arbuckle, Cam										
48	Boston (West)	Simpson, Ord	1941	160	216,470	12,830						
49	Bowring	Layton (Gas) Pen										
50		Perry, Pen	1921	280	x	80,785						
51		Oswego, Pen										
52		Mississippi (Gas) Mis										
53	Branstetter	Bartlesville, Pen										
54		Burgess, Pen	1928	440	x	14,664						
55		Mississippi, Mis										
56	Buell	Various, Pen, Mis	1922	100	x	6,880						
57	Building	Various, Pen, Mis	1925	465	x	13,776						
58	Burbank (Kay & Osage Counties)	Layton, Pen										
59		Burbank *, Pen	1920	24,665	226,153,444	2,167,577						
60		Wilcox, Ord										
61	Burbank (South)	Burbank, Pen	1926-1934	4,465	46,329,754	901,398						
62		Skinner, Pen										
63	Cash Creek	Bartlesville, Pen	1930	1,430	x	39,376						
64		Burgess, Pen										
65	Canyon Creek	Bartlesville, Pen	1923	160		17,024						
66		Burgess, Pen										
67	Country Club	Various, Pen, Ord	1923	515	x	3,434						
68	Dalton	Bartlesville, Pen	1926	205	x	2,039						
69		Burgess, Pen										
70	Dalton (West)	Hunny, Ord	1946	80	22,732	2,803						
71		Arbuckle, Cam	1933									
72	Dewey	Various, Pen	1904	4,920	x	9,509						
73	Dines	Stray, Pen										
74		Bartlesville, Pen	1917	3,740	x	60,990						
75		Mississippi, Mis										
76	Drum Creek	Cleveland, Pen	1946	40	11,819	2,637						
77	Drummond Ranch	Prue, Pen	1945	40	30,300	2,359						
78	Edgewood	Bartlesville, Pen										
79		Burgess, Pen	1921	285	x	2,410						
80		Mississippi, Mis										
81	Elgin (South)	Perry, Pen	1917	1,985	x	33,579						
82		Oswego, Pen										

* Most important producing zone.

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[n]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
1												S	P	1,320	10			
2		1	1		90					33		S	P	1,665	5	A		
3												L	P	1,740	10		Arbuckle	3,732
4	1	1			1							S	P	2,342	15			
5					80				G	39		S	P	2,500	25	A-D		
6												L	P	2,750	12			
7		1	41		624				G	33		S	P	1,480	80	A-D		
8												S	P	1,465				
9		1	33		119					32		S	P	1,660	40	A		
10												S	P	1,810	35			
11												S	P	1,000	35			
12		1			35					34		S	P	1,680	25	A-T		
13												L	P	1,880				
14					86					34		S	P	2,165	10	A-D		
15												L	P	2,265	25			
16					9					36		S-L	P	1,620		D		
17												S	P	1,100				
18												L	P	1,200	75			
19			12		147				G W	33		S	P	1,600	75	A-D-T		
20												S	P	1,900	30			
21												L	P	2,000				
22		4			33					33		S	P	1,680		A-M		
23												S	P	1,830				
24		1			99					34		S	P	1,810		A		
25												L	P	650	70			
26												S	P	700	80			
27		2			53				G	33		L	P	900	80	A		
28												S	P	1,050	25			
29												S	P	1,265	35			
30												S	P	1,500	35			3,832
31		5			18					41		S	P	2,850	13			
32	3	3			3							S	P	2,646	30			
33		5			25					35		L	P	1,680	25	A		
34												S	P	1,880				
35									W	34		S	P	1,330	30			
36		1			42							L	P	2,110		AN-SN		
37												S	P	2,210				
38					4					38-42		L	P	2,531	16		Arbuckle	
39												S	P	2,505	10			
40					2							S	P	1,450				
41									G W	37		S	P	1,790		A	Arbuckle	
42			1		31							S	P	2,325	30			
43												L	P	2,630	60			
44												S	P	2,102		D		
45					7													
46					9					36		S	P	2,825	45	A		
47												D	P	2,900	40			
48					4					38		S-L	P	3,064				
49												S	P	665	60			
50		14	1		27					35		S	P	1,150	30	A		
51												L	P	1,425	35			
52												S	P	1,866	30			
53												S	P	1,450	20	A-D		
54		2	1		28					38		L	P					
55												S-L	P			D		
56					3					37		S-L	P			A		
57			4		25					34		S	P	2,150	10			
58									G	38		S	P	2,750	60	M-L	Granite	4,240
59	2,211	3			1,607							S	P	3,300				
60									P	38		S	P	2,750	50	A		
61	291	4	3		219							S	P					
62		1			38				G	33		S	P	1,550	40			
63												S	P					
64					5					39		S	P	2,050	10	D		
65												S	P					
66					28					33		S	P			D		
67					3					38		S-S	P-P			D		
68														2,300				
69					1							S	P	2,800	30	A-N	Arbuckle	
70												L	P	2,925	2			
71					103					33		L-S	P	650		A		
72												S	P	1,057	67			
73										36		S	P	1,680	100	A-D		
74			1		165							L	P	1,880	45			
75					1					42		S	P	2,852	25		Miss. Chat	3,571
76					1							S	P	2,300	25			
77												S	P					
78					3					35		S	P	2,050	7	D		
79												L	P					
80					87				W			S	P	1,500	50	A		
81												L	P	1,700				
82																		

* Member AIME. The Ohio Oil Co., Tulsa 3, Oklahoma

TABLE 1 – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR OSAGE COUNTY, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION: AREA PROVED ACRES	OIL PRODUCTION: BARRELS TO END OF 1949	OIL PRODUCTION: BARRELS DURING 1949	GAS PRODUCTION: AREA PROVED ACRES	GAS PRODUCTION: MILLION CU FT[c] TO END OF 1949	GAS PRODUCTION: MILLION CU FT[c] DURING 1949	GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION (Thousands of Bbl) TO END OF 1949	CONDENSATE PRODUCTION (Thousands of Bbl) DURING 1949
83	Bufinco	Stray, Pen										
84		Osage, Pen	1921	290	1,057,163	0						
85		Mississippi, Mis										
86	Fairfax	Osage, Pen										
87		Burbank, Pen	1925	220	x	9,576						
88		Wilcox, Ord										
89	Falls Dome	Osage, Pen										
90		Bartlesville, Pen	1920	380	x	10,223						
91		Burgess, Pen										
92	Flat Rock	Osage, Pen										
93		Bartlesville °, Pen	1906	7,485	x	192,505						
94		Burgess, Pen										
95	Flesher	Bartlesville, Pen	1919	320	x	4,445						
96		Mississippi, Mis										
97	Forsker (Redrilled)	Mississippi, Mis	1920-1942		x	2,128						
98	Forsker (South)	Pen Sd. & Mis, Chat		80	x	8,394						
99	Forty-five	Osage, Pen										
100		Skinner, Pen	1916	1,795	x	21,878						
101		Bartlesville, Pen										
102	Frankfort	Peru, Pen	1920		x	0						
103		Mississippi, Mis										
104	G. I. Joe	Burgess, Pen	1945		385,393	55,350						
105	Gilliland	Layton (Gas), Pen										
106		Osage (Gas), Pen										
107		Prue °, Pen	1919	720	3,598,689	23,818						
108		Bartlesville, Pen										
109		Mississippi, Mis										
110		Arbuckle °, Cam										
111	Gilliland (South)	Hominy, Ord	1945	40	4,810	0						
112	Happy Hollow	Osage, Pen										
113		Bartlesville, Pen	1919	540	x	31,331						
114		Burgess, Pen										
115	Hardy	Layton, Pen	1934	40	100,899	5,685						
116	Hickory Creek	Big Lime (Gas), Pen										
117		Osage, Pen	1914	2,220	x	26,727						
118		Bartlesville, Pen										
119		Mississippi, Mis										
120	Hickory Creek (South)	Wayside, Pen	1939	340	1,005,430	37,859						
121	Hominy	Peru, Pen										
122		Osage (Gas), Pen										
123		Bartlesville, Pen	1916	415	x	21,734						
124		Mississippi °, Mis										
125		Hominy, Ord										
126		Arbuckle, Cam										
127	Hominy (East)	Bartlesville °, Pen										
128		Mississippi, Mis	1948	680	x	11,239						
129		Hominy, Ord										
130		Arbuckle, Cam										
131	Hominy (South)	Osage, Pen	1940	80	22,986	2,113						
132	Hominy Falls	Bartlesville, Pen										
133		Tuneta, Pen	1919	1,985	x	14,542						
134		Burgess, Pen										
135		Mississippi, Mis										
136	Jayne	Burgess, Pen	1919	240	x	2,400						
137	Kassabie	Burbank, Pen	1921	160	x	0						
138	Kassabie (South)			40	x	1,359						
139	Kaw	Prue, Pen	1922	180	401,002	16,984						
140		Skinner, Pen										
141	Kaw (South)	Sin, Chat, Mis	1947	40	281,156	108,942						
142	Keystone (East)	Tucker, Hominy, Ord	1948		34,480	27,925						
143	Landon	Peru, Pen										
144		Osage, Pen	1919	145	x	0						
145		Bartlesville, Pen										
146	Lee Dome	Osage, Pen										
147		Bartlesville, Pen	1926	80	x	4,334						
148		Burgess, Pen										
149	Madalene	Osage, Pen										
150		Prue, Pen	1920	520	x	18,269						
151		Bartlesville, Pen										
152	Madalene (East)	Bartlesville, Pen	1923	800	x	13,817						
153	Manion	Osage, Pen										
154		Bartlesville, Pen	1927	460	1,005,279	10,191						
155		Burgess °, Pen										
156	Manion (North)	Bartlesville, Pen	1930	980	x	43,811						
157		Wilcox, Ord										
158	Myers	Swaggart (Gas), Pen										
159		Layton (Gas), Pen	1916	260	x	0						
160		Burgess, Pen										
161	Naval Reserve	Burbank, Pen	1933	3,290	21,663,915	316,068						
162		Simpson, Ord										
163	Naval Reserve (South)	Burbank, Pen	1938	80	488,880	7,503						
164		Simpson, Ord										
165	Nelagony (Redrilled)	Skinner (Gas), Pen	1917-									
166		Bartlesville, Pen	1942	100	x	4,249						
167		Arbuckle (Gas), Cam										

LINE NUMBER	NUMBER OF WELLS[6]			WELLS PRODUCING[7] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[8]	CHARACTER OF OIL[9]		PRODUCING FORMATION					DEEPEST ZONE TESTED[10] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[1]	POROSITY PER CENT[1]	DEPTH TO TOP OF PRODUCING ZONE FT.[4]	PROD. THICKNESS AVG. FT./NET	STRUCTURE[5]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
83			1		Abd.							S	P	2,200	10			
84										36		L	P	2,225				
85												L	P	2,600	4			
86		•										L	P	2,684	10			
87			1		15					38		S	P	2,700	42	M-L		
88												S	P	2,800				
89												L	P	1,950	8			
90					16					36		S	P	2,175	20	A		
91												S	P	2,350	25			
92												L	P	790	55			
93		3	6		541				G	34		S	P	1,100	95	A-J		
94												S	P	1,345	30			
95					3					35		S	P	1,950	40	A		
96												L	P					
97					1					33		L	P	2,850	90	D		
98					4									2,530				
99												L	P	1,035				
100					105					34		S	P			A		
101												S	P	1,575	25			
102					Abd.							L	P	2,040	50	D		
103												S	P	2,045	40			
104	17	3			17							S	P	1,630	20	A		
105													P	1,300	30			
106													P	2,050	60			
107					17					36		S	P	2,340	10	A-D		
108												S	P	2,400	15			
109												L	P	2,500	100			
110												L	P	2,775				
111					1							S	P	2,850	10			
112												L	P	1,900	30	A-D		
113					24					30		S	P	2,275	30			
114										39		S	P					
115					2							L	P	550				
116									G	35		L	P	900	30	A		
117		4	28		126							S	P	1,000	45			
118												L	P	1,300				
119					91				G	36		S	P	1,050	30	A		
120												S	P	1,720	25			
121												L	P	1,870	75			
122					11				G	34		S	P	2,040	10	A	Arbuckle	3,396
123												L	P	2,265	100			
124												S	P	2,540	60			
125												L	P	2,609	70			
126												S	P	2,150	30			
127			1		15					34		L	P			A	Arbuckle	
128												S	P					
129												L	P	2,636				
130										37		L	P					
131			1		3							S	P	1,390	20			
132										36		S	P	1,590	55	A-D	Arbuckle	
133		1	18		29							S	P	1,750	10			
134												L	P	2,045	30			
135					4							S	P	1,750	12			
136					15					40								
137					2													
138					7					35		S	P					
139												S	P					
140										41		L	P	1,328	17		(Miss, Chat)	
141	13	2			13					39		S	P	2,150	16			
142	9	6			9							S	P	1,770	30			
143										35		L	P	1,950	15	A-F	Wilcox	
144					6							S	P	2,050	10			
145												L	P					
146										36		S	P			D		
147					5							S	P					
148												L	P	1,475	150			
149					17					35		S	P	1,535	65	A-F	Turkey Mtn.	
150												S	P	1,900	35			
151					33					35		S	P					
152												L	P	1,808	17			
153			3		11					38		S	P	2,190	30	D	Arbuckle	
154												S	P	2,300				
155										38		S	P					
156		1	3		56							S	P					
157												S	P	985	15			
158					Abd.					34		S	P	1,400	20	D	Wilcox	
159												S	P	2,400	40			
160					207				F	39		S	P	2,940	110	A		
161			2									S	P					
162					7					39		S	P			A		
163												S	P					
164												S	P	1,300	20			
165					5					34		S	P	1,400	60	A-F		
166												L	P	2,330				
167																		

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR OSAGE COUNTY, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
168	New England	Bartlesville, Pen										
169		Burgess, Pen	1920	680	x	122,764						
170		Arbuckle, Cam										
171	Othelata (North)	Prue, Pen	1910	1,560	x	25,696					*	
172		Bartlesville, Pen										
173	Ohio	Cleveland, Pen	1932	195	x	0						
174		Bartlesville, Pen										
175	Okesa	Peru, Pen										
176		Bartlesville, Pen	1904	1,210	x	2,646						
177		Mississippi (Gas), Mis										
178	Osage City	Cleveland, Pen										
179		Bartlesville, Pen	1904	3,805	x	156,250						
180		Arbuckle, Cam										
181	Osage City (East)	Cleveland, Pen	1920	805	x	32,072						
182		Bartlesville, Pen										
183	Osage-Hominy	Peru, Pen										
184		Osage (Gas), Pen										
185		Bartlesville, Pen	1916	1,625	x	231,478						
186		Mississippi, Mis										
187		Hominy *, Ord										
188		Arbuckle, Cam										
189	Page	Various, Pen, Ord, Cam	1918	745	x	48,090						
190	Pawhuska	Bartlesville, Pen										
191		Burgess, Pen	1919	505	x	26,702						
192		Burgen, Ord										
193	Pawhuska (West)	Bartlesville, Pen										
194		Burgess, Pen	1919	180	x	5,374						
195		Burgen, Ord										
196	Pearsonia	Stray (Gas) Pen										
197		Layton (Gas) Pen	1919	220	x	50,819						
198		Osage, Pen										
199		Mississippi *, Mis										
200	Penn Creek	Bartlesville, Pen	1922	160	x	4,468						
201		Mississippi, Mis										
202	Pershing	Cleveland, Pen										
203		Osage (Gas) Pen	1918	5,395	x	69,602						
204		Bartlesville *, Pen										
205		Mississippi, Mis										
206	Pershing (East)	Osage, Pen	1947	100	38,237	26,363						
207	Pettit	Stray, Pen										
208		Cleveland, Pen										
209		Big Lime, Pen										
210		Osage, Pen	1919	285	x	17,142						
211		Bartlesville, Pen										
212		Hominy *, Ord										
213		Arbuckle *, Cam										
214	Pioneer	Various, Pen, Ord	1930	300		14,069						
215	Pioneer (East)	Hominy & Arbuckle, Ord	1949		26,157	26,157						
216	Pond Creek	Various, Pen, Mis	1913	1,395	x	18,070						
217	Prue	Prue (Gas), Pen	1930	475	x	2,924						
218		Bartlesville, Pen										
219	Quapaw	Osage (Gas), Pen	1914	3,645	x	71,848						
220		Bartlesville, Pen										
221	Ramona	Big Lime, Pen										
222		Bartlesville, Pen	1911	1,755	x	65,479						
223		Burgess, Pen										
224	Remington	Mississippi Chat, Mis	1949		20,172	20,172						
225	Signal Hills	Various, Pen, Ord	1944	240	56,680	3,361						
226	Skiatook	Cleveland, Pen										
227		Bartlesville, Pen	1906	715	x	9,634						
228		Burgess, Pen										
229		Mississippi (Gas) Mis										
230	Sunset	Bartlesville, Pen										
231		Hominy, Ord	1919	295	x	1,182						
232		Arbuckle, Cam										
233	Tidal	Burgess, Pen	1918	1,975	x	42,759						
234		Bartlesville, Pen										
235	Turkey Creek	Various, Pen, Mis	1917	305	x	0						
236	Turkey Creek (West)	Stray, Pen	1925		x	0						
237	Twin Creek	Bartlesville, Pen	1928	100	96,420	2,679						
238	White Tail	Stray, Pen										
239		Bartlesville, Pen	1919	205	x	1,793						
240		Mississippi, Mis										
241	Wildcat Hill	Tyner, Ord	1945	80	29,864	7,436						
242	Wildhorse	Cleveland, Pen										
243		Osage, Pen										
244		Skinner, Pen	1919-									
245		Bartlesville *, Pen	1927	4,670	x	140,961						
246		Burgess, Pen										
247		Tyner, Ord										
248	Wildhorse (North)	Various, Pen, Ord	1919	360	x	4,951						
249	Wildhorse (South)	Various, Pen	1923	205	x	5,205						
250	Wildhorse (West)	Arbuckle, Cam	1940	160	210,898	9,554						
251	Woolaroc	Skinner, Pen	1917	2,552	x	39,873						
252		Bartlesville, Pen										

* Most important producing zone.

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. / NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
168												S	P					
169		15			52					34		S	P					
170												L	P					
171			1		79				G W	38		S	P					
172												S	P					
173					Abd.					37		S	P					
174												S	P	1,695	75	D		
175										34		S	P	1,525	20	A-F	Arbuckle	
176					7							L	P	1,645	30			
177												S	P	1,620	25			
178									G	37		S	P	2,250	30	A	Arbuckle	
179		7	16		180							L	P					
180					50				G	37		S	P	1,625	25		Miss	
181												S	P	2,250	30			
182												S	P	1,730	25			
183												S	P	1,870	75	D	Arbuckle	
184			1		135					37		S	P	2,040	10			
185												L	P	2,365	300			
186												S	P	2,540	60			
187												L	P	2,610	70			
188										33		S L						
189		5			37							S	P	2,085	60			
190										35		S	P	2,125	25	A-F	Arbuckle	
191					17							S	P	2,880	26			
192												S	P	2,085	60			
193										36		S	P	2,125	25		Arbuckle	
194		2			8							S	P	2,880	26			
195												S	P	800-1,000	18			
196										36		S	P	1,400	10	A-D		
197					21							L	P	2,100	100			
198												L	P	2,410	40			
199										35		S	P					
200					2							L	P					
201												S	P	1,385	15			
202		3	17		220					35		L	P	1,690	60	D	Miss	
203												S	P	2,030	30			
204												L	P	2,150	40			
205												L	P	1,634				
206		3			6							S	P	800	10			
207												S	P	1,390	30			
208												S	P	1,800	20			
209										36		L	P	1,950	60	D	Arbuckle	
210					15							S	P	2,300	30			
211												S	P	2,600	50			
212												L	P	2,630				
213					19					34		S L	P					
214		1	3		4							S L	P	2,275		A		
215	4	4			44					33		S L	P			D		
216		2	1		11					36		S	P	1,648	30			
217												S	P	1,990	50	A-I		
218					180				G	34		L	P	1,305	60			
219												S	P	1,730	60			
220												S	P	930	100			
221												S	P	1,687	20	I-F		
222			6		76				G	33		S	P	1,753	30			
223										41		L	P	2,970	10			
224	3	3			3							S L	P	415				
225					8							S	P	1,110	15			
226									G	34		S	P	1,370	30	D		
227			11		19							S	P	1,660	10			
228												L	P	1,900	150			
229												S	P					
230					10					36		S L	P					
231												S	P					
232										36		S	P					
233		2	4		103							S	P					
234					Abd.					33		S L	P	1,080				
235					Abd.					33		S	P					
236					5							S	P	2,070				
237												S	P					
238					1							S	P					
239												L	P					
240					4					35		S	P	2,445	15			
241												S	P	1,150	100			
242												L	P	1,250	55			
243												S	P	1,700	50	A-D		
244									G	35		S	P	1,826	110			
245			13		357							S	P	1,990	10			
246												S	P	2,270	25			
247					12					35		S L	P					
248					2					35		S						
249					3					39		L	P					
250					125					34		S	P					
251												S						
252																		

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR OSAGE COUNTY, OKLAHOMA

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU. FT.[c] TO END OF 1949	MILLION CU. FT.[c] DURING 1949		TO END OF 1949	DURING 1949
253	Pyrama	Penn, Ten										
254		Osage, Pen	1917	3,475	x	53,922						
255		Bartlesville *, Pen										
256		Mississippi, Mis										
257		Various, Pen, Ord, Cam		1,900	x	61,132						
258	Aggregate for District of Pools marked x				330,012,234							
259	Total Osage County				656,836,873	7,144,292						

* Most important producing zone.

TABLE 2 - SUMMARY OF DRILLING OPERATIONS IN OSAGE COUNTY, OKLAHOMA

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC.	TWP. SURVEY	RGE. LAT.	RGE. LONG.	TOTAL DEPTH FT.	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL Bbl.	GAS MILLION CU. FT.	CONDENSATE Bbl.	CHOKE FRACTIONS OF AN INCH	PRESSURE LBS. PER SQ. IN. CASING	PRESSURE LBS. PER SQ. IN. TUBING	REMARKS
1	Osage	20	20 N	11 E	2,411	Penna (Nellie Bly)	Wilcox * Arbuckle	Dolomite Prod. Co.	25			Pump			Zone Discovery April 1949 (Page Field)
2	Osage	1	20 N	11 E	2,392	Penna (Nellie Bly-Desery)	Hunny * & Arbuckle *	Waite Drlg. Co.	65			Pump			New Field Disc. March 1949. (Pioneer, E.)
3	Osage	7	25 N	6 E	2,974	Upper Penna (Sand Creek)	Mis, Chat *	A. G. Oliphant	74			Flow Open Tube			New Field Disc. Jan. 1949. (Bennington)
4	Osage	22	25 N	3 E	3,289	Lower Permian (Marion-Herington)	Layton Sand * Mis, Lime	A. G. Oliphant	75			Pump			New Field Disc. Nov. 1949 (Big Pend, E.)

* Producing Horizon

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
253																		
254			5		126					35		S	P	1,600	60	D		
255												S	P	1,745	30			
256					60							C	P	2,088	30			
257														2,280				
258																		
259	119	245			7,325													

TABLE I - OIL AND GAS PRODUCTION STATISTICS IN OKLAHOMA CITY AREA IN 1949

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
	Cleveland											
1	Corbett (West)	Bart, Pen, 2nd Wil, Ord	1945	40	108,923	23,265						
2	Denver (Southeast)	Earlsboro	1948		161,136	148,874						
3	Lexington (Northeast)		1949		6,913	6,913						
4	Moore	Hunton, Dev, 2nd Wil, Ord	1935	1,080	10,096,089	190,897						
5	Moore (South)	Bartlesville, Pen	1944		2,790,893	521,627						
6	Moore (Southeast)	Hvanade, Ord	1947	40	27,276	4,085						
7	Moore (West)	Hunton, Dev, 2nd Wil, Ord	1943	1,440	3,669,596	361,900						
8	Noble	2nd Wil, Ord	1938	50	74,489	Abd.						
9	Norman	Simpson, Ord	1939	40	14,553	None						
10	Short Junction, (West)	Cle, Pen, Chan Hill & Bois d'Arc	1948	40	32,401	18,006						
11	Stella	Bartlesville, Pen Simpson, Ord Dolomite, Ord	1943	40	92,759	7,042						
12	Urbanski				300	Abd.						
13	Arcadia (East)	2nd Wilcox, Ord	1949		304,131	304,131						
14	Arcadia (Northeast)	Wilcox, Ord	1944		2,079,377	236,604						
15	Bethany	Bois d'Arc, Dev	1945	120	251,385	76,667						
16	Britton	Simpson, 2nd Wil, Ord	1935	1,080	3,068,367	67,758						
17	Britton (South)	2nd Wil, Ord Oswego, Pen	1938		331,038	12,333						
18	Coffee Creek	Bart, Pen, Wilcox, Ord Bois d'Arc, Dev			1,249,062	940,045						
19	Edmond	Simpson, Wil, Ord			23,475,440	433,680						
20	Edmond, (Northeast)	Bart, Pen			1,667,353	115,883						
21	Edmond (North)	Bart, Pen			30,147	5,208						
22	Edmond (West)	Bart, Pen Hunton, Dev Bois d'Arc, Dev		31,680	87,964,360	5,487,296						
23	Jones	Cleveland, Pen	1939	3,240	2,482,300	773,968						
24	Lone Star	Cleveland, Pen	1945									
25	Luther (South)	Hunton, Dev	1943	10	2,378	Abd.						
26	Meeker	Bart, Pen, Hunton, Dev	1947	960	367,664	223,058						
27	Newalla		1934		3,247	Abd.						
28	Newalla (South)		1939		24,137	Abd.						
29	Nixona Park	Tropper, Pen	1929	80	378,786	1,997						
30	Oklahoma City, Old Area	Various Pen, Ord, Sil				5,147,618						
31	Oklahoma City Mansion Area	Various Pen, Ord, Sil				2,579,014						
32	Oklahoma City, Total	Various Pen, Ord, Sil	1928	14,320								
33	Prairie Hell (East)	2nd Wil, Ord	1947	160	451,965	402,519						
34	Witcher	Cleveland, Bart, Unconformity, Misener, Pen, Bois d'Arc, Dev	1947	4,760	3,563,132	2,081,119						
35	Edmond (Northeast)	Bart, Pen	1947	1,200	499,962	225,720						
36	Hanson		1948	40	1,029	248						
37	Harrah (West)		1948	40	5,576	3,428						
38	Kate	Bart, Pen	1941	120	120,940	15,848						
39	Pauline		1947	40	1,689	362						

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR NORTHEASTERN OKLAHOMA

LINE NUMBER	FIELD (County)[A]	PRODUCING FORMATION NAME AND AGE[B]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[C] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
1	Craig County					2,920						
2	Nowata County					2,736,770						
3	Rogers County					444,935						
4	Washington County					1,108,870						
5	Total Northeast Oklahoma			814,670	389,131,653	4,293,495						

WARD M. EDINGER *

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[o] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT / NET	STRUCTURE[n]	NAME	DEPTH OF HOLE, FT
1	2			2						41				5,800	30			
2	13				13					38.5								
3	2			2						46				7,255	30			
4	15		1		14										12		2nd Wilcox	8,966
5	34		5		29													
6	2	1			2									8,780	12			
7	36				36									7,670	2			
8	1									40				5450-6496	15-25-13			
9	1				1					38.5								9,098
10	1				1					41				8,145	105			
11	2				2									5450-6496	15-25-13			
12	1									32.5				5,960	8			
13	7			7														
14	23	1			20									7,154	66			
15	17	1			4									6,750				
16	20				12					28-39				6,218				
17	3				3					35				6,758				
														5,800	15-25			
18	49			48	1					42-44				6,100				
19	68		4		64					44								
20	26			26			2,450	1,250		46			14-17	5,800	15			
21					1					42								
22	792	11		792						40				6,498	24			
														6,938	16			
														6,985	51			
														4,800	12		2nd Wilcox	
23	135	13			135					37								
24	1																	
25	1													6,271				
26	24	18		24														
27	1													6,157				
28																		
29				1						41								
30	539		31		478													
31	392		15		171					38								
32	731		46		649									6,526	8		Wilcox	
33	4	3			4					41								
34	119	45		100	12													
														6,800			2nd Wilcox	
35	10	2																
36	1																	
37	1																	
38	3			3			2,500	1,600		44			16	5,900	10			
39	1			1														

* Co-owner, Production Engr. Labs., 7212 N. May, Oklahoma City, Okla. Member ABE.

R. E. McMILLEN

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[o] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT / NET	STRUCTURE[n]	NAME	DEPTH OF HOLE, FT
1																		
2																		
3																		
4																		
5			176		13,519													

SOUTH TEXAS AREA

Oil And Gas Developments In South Texas During 1949

By G. S. WILSON *

The South Texas Area comprises Texas Railroad Commission Districts 2 and 4. The 26 counties within the area are shown on the accompanying map.

PRODUCTION

A decreased demand for crude in 1949 resulted in a decrease in oil production in South Texas from 156 million barrels in 1948 to 117 million barrels in 1949.

DRILLING AND DEVELOPMENT

The decreased demand for crude resulted in fewer wells being drilled in South Texas during 1949 than in 1948. Some 1,993 wells of all categories were drilled in 1949, as compared with the 1948 total of 2,137 wells.

Of the 1,993 wells drilled in 1949, 1,371 were development wells, and 622 were exploratory. Although the total number of 1949 wells was about seven per cent less than the 1948 total, 1949's exploratory tests represented a five per cent increase over the corresponding number for the year 1948.

About 24 per cent of the exploratory wells drilled in 1949 were completed successfully as producers. Of the successful tests, 88 were classed as oil wells, and 62 as gas or gas-condensate.

Of the 1,371 development wells drilled in 1949, 908 were completed as oil wells, 172 were completed as gas or gas-condensate wells, and 291 were dry holes.

The average depth of all wells drilled in South Texas during 1949 was in the neighborhood of 5,200 ft, which represents no significant change from the average depth of wells drilled the preceding year.

* MAGNOLIA PETROLEUM CO., ALICE, TEXAS.
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During 1949 there were approximately 400 wells abandoned or shut in for an indefinite period. During the same period some 750 oil wells were put on the pump or were lifted by gas lift. At the end of 1949, roughly 48 per cent of the 13,800 producing oil wells in South Texas were on artificial lift.

NEW DISCOVERIES IN 1949

Although there were numerous new fields and pools discovered in South Texas in 1949, there were none which show promise of developing into major oil reserves.

Exploratory drilling on the King Ranch in Brooks, Kennedy, and Kleberg Counties contributed several new oil and gas discoveries and new producing zones in known fields.

A discovery of importance was made in the La Sal Vieja Area, Willacy County. The discovery well produced oil from about 8,300 ft.

Exploratory wells drilled in Duval County accounted for 13 discoveries. Most of these were in Jackson sands, at relatively shallow depths.

The deepest discovery of the year was in San Patricio County, where a gas well was completed at 9,984 ft.

Most of the year's discoveries were in the Frio sand of Lower Oligocene Age. Some 24 new fields and pools were completed in the Frio sand, with smaller numbers completed in the Wilcox, Jackson, and Yegua sands. Twelve Wilcox discoveries were made in Railroad Commission District Two which comprises the northern part of the South Texas Area; 12 Jackson and six Yegua discoveries were completed in Railroad Commission District Four, which is the southern part of the area.

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR SOUTH TEXAS IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
1	Adams, *Webb*	Mirando, Eoc.	1939	300	836,457	31,100						
2	Agua Dulce, *Nueces*	Frio, Olig	1928	35,000	25,558,117	2,094,665						
3	Agua Prieta, *Duval*	Pettus, Eoc	1941	320	622,246	95,159						
4	Albercas, North, *Webb*	Mirando, Eoc	1945	80	223,075	91,011						
5	Albert West, *Live Oak*	Wilcox, Eoc	1945	640	20,399	1,252						
6	Alfred, *Jim Wells*	Frio Vicksburg, Olig	1938	420	1,507,350	67,838						
7	Alice, *Jim Wells*	Frio Vicksburg, Olig	1938	1,200	5,207,342	69,980						
8	Alta Mesa, *Brooks*	Catahoula, Olig	1936	2,250	3,863,238	301,966						
9	Alta Mesa, East, *Brooks*	Frio, Olig	1947	80	43,712	32,050						
10	Alta Mesa, 4,500', *Brooks*		1948	80	4,904	1,031						
11	Alta Mesa, 4,560', *Brooks*		1947	40	9,257	4,935						
12	Alta Mesa, 4,950', *Brooks*		1947	120	59,795	20,401						
13	Anaqua, *Victoria*	Frio, Olig	1948	120	44,107	42,447						
14	Aransas Pass, *Aransas*	Frio, Olig	1936	6,200	18,097,564	447,569						
15	Armstrong, *Jim Hogg*	Lana Novia, Eoc	1943	600	1,660,460	174,399						
16	Armstrong, South, *Jim Hogg*	Pettus, Eoc	1948		135,690	123,491						
17	Arrow Head, *Hidalgo*	Frio, Olig	1948	100	130,275	102,419						
18	Aviators, *Webb*	Mirando, Eoc	1922	1,420	7,331,507	185,538						
19	Aviators, North, *Webb*	Jackson, Eoc	1947	120								
20	Bailey, *Nueces*	x	1949	160	96,270	96,270						
21	Baldwin, *Nueces*	Catahoula, Olig	1935	600	2,314,906	247,622						
22	Benavides, *Duval*	Cole-Yegua, Eoc	1937	3,900	19,077,973	559,914						
23	Benavides, East, *Duval*	Gov't Wells, Eoc	1941	100	131,504	8,647						
24	Ben Bolt, *Jim Wells*	Frio, Olig	1939	2,100	6,031,774	208,452						
25	Bird Island, *Kleberg*	Frio, Olig	1938	60	61,899	1,173						
26	Bishop, *Nueces*	Frio-Vicksburg, Olig	1947	200	319,531	103,682						
27	Blanconia, *Bee*	Frio-Vicksburg, Olig	1943	400	235,842	28,765						
28	Blanconia, South, *Bee*	Frio, Olig	1948	80	151,093	113,050						
29	Bloomington, *Victoria*	Frio-Vicksburg, Olig	1947	1,000	4,103,230	1,790,448						
30	Blucher, *Jim Wells*	Frio-Vicksburg, Olig	1939	750	844,532	-						
31	Bonnie View, *Refugio*	Goeta, Olig	1939	1,320	4,457,054	832,631						
32	Bonnie View, 6,200', *Refugio*	Frio, Olig	1948	40	49,705	5,328						
33	Borosa, *Starr*		1948	280	134,884	129,645						
34	Borregas, *Kleberg*	Frio, Olig	1945	960	1,878,303	781,458						
35	Boyce, *Goliad*	Wilcox, Eoc	1945	500	687,273	133,768						
36	Boyce, Pettus, *Goliad*	Pettus, Eoc	1948	120	23,379	18,900						
37	Boyce, West, *Goliad*	Pettus, Eoc	1949	20	2,466	2,466						
38	Boyle, *Starr*	Frio, Olig	1940	80	1,729,706	146,549						
39	Brandt, *Goliad*	Wilcox, Eoc	1947	400	345,564	178,263						
40	Brayton, *Nueces*	Frio, Olig	1944	1,500	2,416,645	1,004,170						
41	Bridwell, *Duval*	Pettus, Eoc	1940	320	470,731	18,480						
42	Brownlee, *Jim Wells*	Vicksburg, Olig	1944	100	11,718	-						
43	Bruni, *Webb*	Cole-Yegua, Eoc	1934	700	2,959,072	4,000						
44	Bruni, East, *Webb*	Yegua, Eoc	1937	80	x	4,452						
45	Buena Vista	Pettus, Eoc	1949	60	3,886	3,886						
46	Burnell, *Karnes*	Wilcox, Eoc	1943	760	1,319,547	439,923						
47	Burnell, South, *Karnes, Bee*	Pettus, Eoc	1937	360	1,662,192	180,186						
48	Cabeza Creek, *Goliad*	Pettus, Eoc	1947	250	534,741	48,180						
49	Cabeza Creek, South, *Slick, Goliad*	Wilcox, Eoc	1944	430	x	139,867						
50	Cabeza Creek, South, *Goliad*	Wilcox, Eoc	1944	250	315,723	63,505						
51	Cadena, *Duval*	Frio, Olig	1942	720	1,022,388	79,992						
52	Caesar, *Bee*	Pettus, Eoc	1934	300	1,104,199	4,001						
53	Caesar, South, *Bee*	Wilcox, Eoc	1942	2,000	3,764,527	363,374						
54	Caballen, *Nueces*	Hengen Sd.	1949	160	58,682	58,682						
55	Cam, *Duval*	Yegua, Eoc	1947	700	676,258	176,429						
56	Cameron, *Starr*	Pettus, Eoc	1943	1,200	1,931,709	306,159						
57	Captain Lacy, *Jim Wells*	Frio-Vicksburg, Olig	1932	220	669,381	18,006						
58	Casa Blanca, *Duval*	Cole, Eoc	1938	750	1,925,096	114,403						
59	Casa Blanca, North, *Duval*	Cole, Eoc	1939	300	381,276	30,142						
60	Casa Blanca, West, *Duval*	Cole, Eoc	1941	399	553,827	44,587						
61	Cecil, *Duval*	x	1948	40	2,024	316						
62	Cedro Hill, *Duval*	Cole, Eoc	1938	1,000	2,879,432	239,024						
63	Cement, *Nueces*	x	1949	40	1,261	1,261						
64	Chapman Ranch, *Nueces*	Catahoula, Olig	1937	120	254,023	21,896						
65	Charanguosa, *Duval*	Cole, Eoc	1935	450	1,352,770	43,436						
66	Charanguosa, East, *Duval*	Mirando, Eoc	1949		1,874	1,874						
67	Charanguosa, North, *Duval*	Cole, Eoc	1948	40	8,193	8,193						
68	Charanguosa, South, *Duval*	Cole, Eoc	1941		196,349	31,522						
69	Charco				2,252	2,252						
70	Charco Redondo, *Zapata*		1913		x	302						
71	Charco Redondo, East	Cole, Eoc	1946	400	143,071	8,693						
72	Charco Redondo, East Seg. A		1949	120	10,833	10,833						
73	Chiltipin, North	Jackson, Eoc	1949	100	53,617	53,617						
74	Clara Driscoll, *Nueces*	Frio, Olig	1935	650	2,430,730	159,023						
75	Clara Driscoll, S, *Nueces*	Frio, Olig	1937	2,000	7,537,840	336,390						
76	Cody, *Nueces*	x	1949	60	14,110	14,110						
77	Cole West, *Duval*	Jackson, Eoc	1936	900	5,646,010	97,516						
78	Collieto Creek, *Victoria*	Catahoula, Olig	1934	640	3,542,360	464,179						
79	Collieto Creek, S, *Victoria*	Catahoula, Olig	1948	440	539,967	124,510						
80	Collier, *Jackson*	Miocene	1942	160	264,585	30,488						
81	Coastal, *Starr*	x	1948	120	85,847	40,133						
82	Colmena, *Duval*	Cole, Eoc	1934	320	852,961	79,209						
83	Cologne, *Victoria*	Miocene	1939	240	496,177	19,518						
84	Colorado, *Jim Hogg*	Cockfield, Eoc	1936	3,240	9,759,633	1,807,196						
85	Comitas, *Zapata*	McElroy, Eoc	1934	750	2,165,409	41,802						

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION						DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT PAY[l]	STRUCTURE	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT														
1	72		26		46					21		S	P	975	7	M L	Yegua	1,517
2	508		338	144	26					40		S	P	4,650	25	A F	Yegua	13,736
3	25		5	5	15					36		S	P	4,315	10	N F	Yegua	5,496
4	14	7			14					12		S	P	2,313	5		Mirando	2,675
5	4		3	1						34		S	P	6,730	10		Wilcox	7,387
6	24		10	8	6					41		S	P	3,295	20	A F	Yegua	6,535
7	73		56	6	11					46		S	P	3,225	15	M L	Yegua	7,767
8	55		19	1	35					24		S	P	2,400	8	D S	Yegua	8,822
9	3	1		1	2					42		S	P	7,620	54	D S	Frio	10,507
10	2		1	1						46		S	P	4,512	x	x	x	x
11	1				1					47		S	P	4,560	x	x	x	x
12	3	1		1	1					46		S	P	4,952	x	x	x	x
13	6	5		3	3					33		S	P	5,259	4	S L		
14	362		313	8	41					43		S	P	6,500	9	A F	Frio	10,468
15	51		21	16	14					37		S	P	3,240	10	M F	Frio	5,533
16	13	10		2	11					27		S	P	3,309	10	N	Loma Novia	3,215
17	6	1		6						47		S	P	6,975	12	M L	Frio	9,130
18	264		167		97					21		S	P	1,525	11	M F	Cook Mtn.	3,975
19	10		5		10					21		S	P	1,790	10		Jackson	1,823
20	8	2		6						38		S	D	5,940	x	x	x	6,040
21	23	1		1	22					35		S	P	2,900	8	A F	Frio	6,707
22	281		177	6	98					45		S	P	3,840	19	A F	Yegua	6,510
23	2		1	1						43		S	P	4,915	10	A F	x	x
24	85		34	29	22					36		S	P	4,500	14	A F	Yegua	6,140
25	3		2	1						44		S	P	7,205	8	A F	Frio	9,636
26	18		3	13	2					41		S	P	7,133	34	A F	Vicksburg	7,750
27	14		9	3	2					25		S	P	4,060	16	A F	Vicksburg	5,605
28	5	1		5						33		S	P	5,261	10	x	Frio	5,265
29	136	11		117	19					23		S	P	4,914	5			
30	18		6	12						58		S	P	7,500	29	D	Vicksburg	8,300
31	74		5	67	2					26		S	P	4,550	33	A F	Frio	6,505
32	1				1					41		S	P	6,200	12	x	x	x
33	7	5		7						48		S	P	4,273	x	x	x	x
34	54	7		54						38		S	P	6,992	25		Vicksburg	8,549
35	22		5	14	3					34		S	P	7,640	10	A F	Wilcox	8,515
36	3	1		3						45		S	P	4,245	x		x	x
37	1	1			1					47		S	P	4,208	6		Wilcox	7,898
38	41		5	10	26					44		S	P	3,490	10	A F	Jackson	5,900
39	12	2		10	1	1				32		S	P	7,713	10		Wilcox	8,506
40	73	6		70	3					38		S	20	7,200	40	F	Frio	7,709
41	13		6	1	6					43		S	P	4,292	8	M F	Yegua	4,647
42	2		2	0	0					42		S	P	4,950	6	x	Vicksburg	5,398
43	29		25	1	3					19		S	P	1,800	12	x	Mt. Selman	10,295
44	1				1					39		S	P	3,431	10	F	Heklow	6,394
45	3	3		3						24		S	P	1,761	9	S L	Pettus	1,800
46	58	3		44	2	12				53		S	P	6,744	18	F	x	x
47	37		9		26	2				36		S	P	3,423	16	F	Pettus	3,940
48	11		6	4		1				50		S	P	7,743	15	F	Wilcox	8,972
49	9	2		9						50		S	P	7,743	17	F	Wilcox	8,972
50	13		3	3	3	4				53		S	P	8,210	10	F	Wilcox	9,018
51	21		2	8	11					40		S	P	3,460	6	A F	Cook Mtn.	6,490
52	42		41		1					25		S	P	3,070	15	D F	Yegua	4,230
53	44		1	31	4	7				42		S	P	6,504	20	D F	Wilcox	7,507
54	4	4		4						40		S	P	7,739	x	x	x	x
55	35		3	6	26					39		S	P	3,319	6		Jackson	4,337
56	30		4	12	13	1				23		S	P	4,100	25	M F	Jackson	6,262
57	23		16	2	4	1				47		S	P	3,850	11	A F	Yegua	6,500
58	66		9		51					21		S	P	1,180	8	M L	Cockfield	2,269
59	9				9					21		S	P	1,030	10	M L	Yegua	1,788
60	17		2		15					21		S	P	994	8	M L	Yegua	2,246
61	1			1						38		S	P	4,000	x	x	x	x
62	81		?		74					20		S	P	1,436	10	MRL	Yegua	2,646
63	1	1			1					40		S	P	6,620	8			7,064
64	5		1	1	3					28		S	P	3,900	10	A F	Frio	7,750
65	41		25		15	1				20		S	P	1,040	8	MRL	Queen City	3,822
66	1	1			1					20		S	P	1,583	6		Mirando	1,590
67	2			1						21-33		S	P	2,064	x	x	x	x
68	15		1		14					20		S	P	1,515	10	MRL	Cook Mtn.	3,892
69					1													x
70	29	1			29					17				1,800	x	x	x	x
71	3				3					20		S	P	1,691	6	L	x	1,852
72	11				11					x		S	P	1,670	x	x	x	x
73	5			5						44		S	P	4,151	4	A F	Pettus	4,705
74	31		11	3	15					23-37		S	P	3,800	15	A	Vicksburg	8,055
75	69		31	12	56					29-40		S	P	3,900	10	A	Frio	7,605
76	3				3					25		S	P	4,320	x	x	x	x
77	65		6		59					21		S	P	2,350	12	A F	Yegua	3,985
78	65		4	44	21					23		S	P	2,776	10	D F	Yegua	7,860
79	11		1	8	2					26		S	P	4,623	5	x	Catahoula	4,859
80	10		?	3						24		S	P	2,417	15	D	Frio	4,905
81	7	3	?	?						42		S	P	5,760	15	A	x	5,850
82	36		1		35					21		S	P	1,486	15	D	Yegua	3,390
83	5			1	4					25		S	P	4,827	x	x	x	x
84	245		18	28	199					47		S	P	2,820	10	M L	Cook Mtn.	4,510
85	195		116		79					21		S	P	800	10	M L	Cook Mtn.	3,502

TABLE I – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTH TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
86	Canoso Driscoll, *Basal*	Frio, Olig	1924	3,580	11,888,117	860,767						
87	Copano Bay, *Hunton*	x	1949		71,821	71,821[e]						
88	Cordelle, *Jackson*	Catahoula, Olig	1938	630	4,578,912	234,708						
89	Conden, West, *Ite*	Wilcox, Eoc	1944	720	924,944	324,498						
90	Conden, West Markham, *Ite*	Wilcox, Eoc	1943	160	534,336	188,217						
91	Cottonwood Creek, *Deadt*	x	1946	130	12,799	9,826						
92	Corpus Christi, *Hunton*		1935	40								
93	Corpus Christi, Deep, *Hunton*		1949	40	3,259	3,259						
94	Corpus Christi, West, *Hunton*	Frio, Olig	1948	80	79,382	50,055						
95	Cuevano, *Basal*	Pettus, Eoc	1949	40	550	550						
96	Cuellar, *Zapata*	McElroy, Eoc	1977	540	2,700,458	6,834						
97	Dan Sullivan, *Brooks*	Frio, Olig	1944	80	9,334	260						
98	Dashaw, *Hidalgo*	Frio, Olig	1949	40	346	346						
99	Dee Davenport, *Starr*	Frio, Olig	1947	300	303,919	109,217						
100	Diamond Bell, *Goliad*	Cockfield, Eoc	1936	240	732,836	10,902						
101	Diego, *Basal*	Jackson, Eoc	1949		6,386	6,386						
102	Dino, *Basal*	Cole, Eoc	1949		10,495	10,495						
103	Dirks, *Ite*	Cockfield, Eoc	1934	865	7,660,945	100,188						
104	Dougherty, *Hunton*	x	1944	40	15,132	7,414						
105	D C B 79, *Basal*	Cole, Eoc	1948	300	58,534	51,415						
106	Driscoll, N.	x	1946	40	x	4,536						
107	Dubose, *Webb*	x	1943	300	554,563	70,717						
108	Eagle Hill, *Basal*	Cole, Gov. Wells, Eoc	1933	640	2,915,008	160,676						
109	East, *Jim Hogg*	Cockfield, Eoc	1942	400	512,230	89,680						
110	El Mesquite, *Basal*	Luna Novia, Eoc	1948	40	1,638	1,156						
111	El Mesquite, S., *Basal*	Jackson, Eoc	1949	40	1,039	1,039						
112	El Tanque, *Starr*	Frio, Olig	1937	130	509,630	8,181						
113	Escobas, *Zapata*	Yegua, Eoc	1944	3,690	9,176,425	160,635						
114	Fagan, *Refugio*	Oakville, Mio; Frio, Olig	1940	300	119,419	5,264						
115	Falfurrias, *Brooks*	x	1948	20	2,719	2,719						
116	Falls City, *Karnes*	Wilcox, Eoc	1944	1,900	5,530,255	1,046,238						
117	Farnin, *Goliad*	Frio, Olig	1949	40	11,150	11,150						
118	Farnin, N., *Goliad*		1949	40	306	306						
119	Farenthold, *Hunton*	Frio, Olig	1947	320	833,909	347,011						
120	Fitzsimmons, *Basal*	Mirando, Pettus, Eoc	1938	900	4,360,316	164,272						
121	Fitzsimmons, N., *Basal*	Pettus, Eoc	1948	120	95,697	62,408						
122	Flores, *Starr*	Vicksburg, Olig	1945	40	10,830	678						
123	Floresville East, *Wilson*	V. Mudwty	1948	80	23,569	20,387						
124	Flour Bluff, *Hunton*	Frio, Olig	1936	2,300	12,861,666	657,870						
125	Flour Bluff East, *Hunton*	Frio, Olig	1940	600	2,804,137	262,942						
126	Ft. Merrill, *Late Out*	Pettus, Eoc	1949	100	53,854	53,854						
127	Forty Nine, *Basal*	Jackson, Eoc	1949	40	201	201						
128	Francitas, *Jackson*	Frio, Olig	1938	1,500	1,699,770	208,854						
129	Fulton Beach, *Aransas*	Frio, Olig	1947	640	1,195,966	767,418						
130	Gaffney, *Victoria*	Frio, Olig	1945	80	34,379	6,837						
131	Gallagher, *Jim Wells*	Frio, Vicksburg, Olig	1940	160	106,353	22,134						
132	Ganada, *Jackson*	Frio, Olig	1937	2,200	3,704,990	77,956						
133	Ganada, Deep, *Jackson*		1948	400	1,194,242	495,330						
134	Ganada, West, *Jackson*	Frio, Olig	1940	1,760	4,898,790	529,757						
135	Gandy, *Hunton*	Frio, Olig	1939	180	635,082	26,135						
136	Garcia, *Starr*	Frio, Olig	1942	2,000	6,618,538	917,620						
137	Glenn, *Webb*	Mirando, Eoc	1940	700	2,681,145	101,898						
138	Goebel, N., *Late Out*	Wilcox, Eoc	1949	40	4,425	4,425						
139	Goree, *Ite*	Wilcox, Eoc	1949	40	3,787	3,787						
140	Gomez, *Basal*	Luna Novia, Eoc	1945	200	377,860	36,543						
141	Gottschalt, *Goliad*	Markham, Eoc	1948	480	902,250	351,904						
142	Gov't. Wells N., S., *Basal*	Jackson, Eoc	1931	8,500	64,044,718	1,093,118						
143	Gov't. Wells, 900', *Basal*	Cole, Eoc	1948	100	44,136	31,109						
144	Gov't. Wells, 1,500', *Basal*		1949	20	1,325	1,325						
145	Gov't. Wells, 1,800', *Basal*		1943	440	36,256	36,256						
146	Green, *Karnes*	Wilcox, Eoc	1944	340	109,917	64,264						
147	Green Lake, *Karnes*	x	1948	80	4,656	2,129						
148	Greer Wood, *Starr*	Frio, Olig	1949	20	1,076	1,076						
149	Greta, *Refugio*	Oakville-Mio; Frio, Olig	1933	4,800	50,105,947	2,836,553						
150	Greta Deep, *Refugio*	Frio, Olig	1933	700	2,006,184	320,547						
151	Guerra, *Starr*	Cole, Eoc	1933	400	2,630,028	185,344						
152	Gup Hill, *Brooks*	Frio, Olig	1945	160	31,489	2,593						
153	Haldeman, *Jim Wells*	Frio, Olig	1941	340	529,760	227,939						
154	Harmon, *Jackson*	Frio, Olig	1942	600	1,097,363	80,815						
155	Henshaw, *Jim Wells*	Frio-Vicksburg, Olig	1940	80	162,555	11,455						
156	Herbst, *Basal*	Jackson, Eoc	1944	40	56,949	3,060						
157	Hyser, *Calhoun, Victoria*	Frio, Olig	1936	3,280	33,901,266	1,107,776						
158	Hansart, *Live Oak*	Yegua, Eoc	1945	330	86,959	23,469						
159	Hobson, *Karnes*	Wilcox, Eoc	1943	220	1,427,875	166,866						
160	Hoffman, *Basal*	Gov't. Wells, Luna Novia, Eoc	1933	6,000	18,460,499	1,526,879						
161	Holstein, *Jim Hogg*	Pettus, Eoc	1940	100	226,060	13,986						
162	Holland, *Starr*	Frio, Olig	1946	60	72,918	16,983						
163	Hollow Tree, *Jim Wells*	x	1949	40	905	905						
164	Holmark, *Ite*	Hockley, Eoc	1935	300	373,100	30,588						
165	Holmark, Wilcox, *Ite*	Wilcox, Eoc	1948	120	22,935	17,965						
166	Holly, *Deadt*	Wilcox, Eoc	1948	120	143,011	62,273						
167	Hondo Creek, *Karnes*	Wilcox, Eoc	1943	140	235,911	11,911						
168	Hurdles Creek, *Goliad*	Yegua, Eoc	1940	80	327,394	137,335						

LINE NUMBER	NUMBER OF WELLS[6]			WELLS PRODUCING[7] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[8]	CHARACTER OF OIL[9]		PRODUCING FORMATION					DEEPEST ZONE TESTED[10] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[1]	POROSITY PER CENT	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT. NET	STRUCTURE[2]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
86	125		64	21	40					30		S	P	2,100	13	N L	Cook Mtn.	5,390
87	2	2		2						44		S	P	7,685	5	x	x	7,772
88	50		5	18	23					22		S	P	2,566	15	A F	Frio	5,117
89	35	4		15	19	1				62		S	P	7,390	12	A	Wilcox	8,293
90	17	1		6	9	3				62		S	P	7,450	10	A	Wilcox	x
91	3			2		1				36		S	P	7,616	x	A	x	7,784
92	1			1						36		S	P	4,800	x	x	x	x
93	1			1						51		S	P	6,917	x	x	x	x
94	5	3		4		1				46		S	P	11,115	55	A	Frio	11,400
95	1	1			1					39		S	P	3,573	2	S L	Yegua	3,700
96	86		73		13					21		S	P	1,525	10	M L	Mt. Selman	4,523
97	2			1		1				44		S	P	8,508	9	x	Vicksburg	10,002
98	1	1		1						45		S	P	4,259	3	S L	Frio	4,271
99	7			7						38		S	P	4,098	14	x	Frio	5,501
100	22		17	1	3	1				40		S	P	3,660	14	A F	Yegua	4,540
101				1						49		S	P	4,730	7	A F	Jackson	5,004
102					7					19		S	P	1,800	11	x	Cole	1,814
103	101		44	1	56					44		S	P	3,819	16	A F	Yegua	4,776
104	1			1						35		S	P	5,377	x	x	x	x
105	15	13			15					20		S	P	1,476	3	F	Cole	2,539
106	1			1						34		S	P	3,160	x	x	x	x
107	23				23					21		S	P	1,800	x	x	x	x
108	63		13		50					19		S	P	1,450	10	M F	Yegua	2,552
109	12		2	8	2					49		S	P	4,741	10	A	Yegua	5,803
110	1			1						46		S	P	3,020	26	S L	Lima Navia	3,044
111	2	2		1	1					40		S	P	3,057	11	S L	Jackson	3,217
112	12		4		8					23		S	P	425	8	M L	Jackson	2,840
113	300		114		186					30		S	P	900	12	A F	Cook Mtn.	3,900
114	9		7	1	1					28		S	P	2,118	15	A F	Frio	7,200
115	1			1						43		S	P	7,275	x	x	x	x
116	65	1		63	2					45		S	P	4,650	10	F	Wilcox	6,400
117	1	1		1						25		S	P	3,721	8	S L	x	4,815
118	1	1		1						x		S	P	5,920	x	x	x	x
119	26			21	1	4				38		S	P	5,610	x	x	x	x
120	80		27	9	44					46		S	P	3,952	10	M F	Yegua	5,385
121	4	1		2	2					44		S	P	4,497	5	S L	Pettus	5,041
122	1	1			1					39		S	Low	5,845	25	x	Vicksburg	7,504
123	2	1			2					22		S	P	2,734	23	F	Midway	2,747
124	117		44	26	36	9				43		S	P	6,590	25	A F	Frio	7,504
125	25		1	22		2				42		S	P	6,753	8	A F	Frio	8,494
126	5	5		5						47		S	P	4,538	6		Pettus	4,775
127	1	1			1					30		S	P	1,374	12	S L	Pettus	2,622
128	26		6	20						50		S	P	7,378	15	D	Vicksburg	10,665
129	51	31		45	4	2				43		S	P	7,126	10	A F	Frio	8,370
130	6		1	2	1	2				28		S	P	5,017	10	x	Vicksburg	5,480
131	5		1	3	1					39		S	P	5,189	11	M F	Yegua	6,360
132	73		64	2	6	1				25		S	P	5,080	15	A	Vicksburg	12,206
133	50		1	45	4					35		S	P	6,483	x	x	x	x
134	58			53	4	1				24		S	P	4,720	32	F	Frio	6,817
135	10		4	1	3	2				40		S	P	5,556	25	F	Frio	7,500
136	106	4		91	15					42		S	P	3,740	6	A F	Frio	6,667
137	77		19		58					22		S	P	2,160	12	M L	Yegua	2,240
138	2	2		2						42		S	P	6,674	7	F C	Wilcox	7,153
139	1			1						40		S	P	7,199	3	A F	Wilcox	8,301
140	10		2	5	3					24		S	P	2,470	10	x	Jackson	2,540
141	22	14		20		2				35		S	P	7,676	6	A F	Wilcox	8,100
142	855		302	2	550	1				21		S	P	1,550	17	S L	Mt. Selman	5,858
143	5	3			5					20		S	P	918	22	S L	Cole	937
144	1	1		1						21		S	P	1,508	x	x	x	x
145	11				11					29		S	P	1,800	x	x	x	x
146	6		1	4	1					36		S	P	6,538	5	A	Wilcox	6,830
147	1			1								S	P					
148	1	1		1						22		S	P	1,315	6	S L	Frio	1,321
149	269		81	143	45					23		S	P	3,500	15	A	Vicksburg	7,473
150	12			9	2	1				29		S	P	6,250	x	x	Vicksburg	7,401
151	22		11	4	5					31		S	P	1,745	14	M F	Yegua	3,600
152	6				3	3				43		S	P	6,655	15		Vicksburg	8,518
153	18			11	7					33		S	P	5,019	11	M F	Yegua	6,490
154	18		3	5	10					29		S	P	6,310	10	F	Frio	6,717
155	4		2	1		1				31		S	P	5,778	11	M F	Vicksburg	5,895
156	4		2		2					31		S	P	2,830	4	S L	Jackson	2,980
157	279		102	103	71	3				11		S	P	5,400	25	A	Frio	7,444
158	10		6	2		2				32		S	P	4,770	13	x	Yegua	6,518
159	11			11						32		S	P	4,000	20	A F	Wilcox	7,474
160	386		4	81	301					21		S	P	2,552	17	A F	Mt. Selman	6,829
161	10		5		5					25		S	P	2,793	10	M L	Yegua	3,485
162	5		1	2	2					24		S	P	2,959	7	x	Frio	3,434
163	1	1			1					24		S	P	3,354	x	x	x	x
164	9		1	2	6					40		S	P	3,500	5	A F	Wilcox	8,914
165	4	1		4						38		S	P	8,078	6	A	Wilcox	8,130
166	9	2		8	1					35		S	P	7,602	11	M F	Wilcox	7,615
167	4	1		1	2					49		S	P	6,582	64	A	Wilcox	8,160
168	13			10	1	3				43		S	P	4,545	10	F	Cook Mtn.	6,004

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTH TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
169	Hughes, *Webb*	Jackson, Eoc	1946	240	338,649	80,145						
170	Hynes, *Karnes*	Wilcox, Eoc	1945	100	301,033	40,481						
171	Ira, *Starr*	x	1945	20	x	1,357						
172	Jay Welder, *Calhoun*	Catahoula, Olig	1940	100	653,860	57,909						
173	Javelina, *Hidalgo*	Frio, Olig	1947	40	2,168	223						
174	Jay Simmons, *Starr*	Frio, Olig	1947	300	235,757	132,745						
175	Jennings, *Zapata*	Yegua, Eoc	1914	800	33,802,573	157,034						
176	Joe Vann, *Zapata*	Yegua, Eoc	1947	160	7,443	3,998						
177	Keeran, *Victoria*	Frio, Olig	1932	920	3,516,540	199,104						
178	Kelsey, *Brooks*	Frio, Olig	1938	3,200	8,947,236	398,452						
179	Kelsey, Deep, *Brooks*	Frio, Olig	1940	4,400	x	1,197,314						
180	Kenard, *Starr*	Frio, Olig	1947	240	190,621	40,738						
181	Killam, *Webb*	Mirando, Eoc	1937	950	1,654,275	35,722						
182	Killam, N., *Webb*	Mirando, Eoc	1938	80	99,638	2,106						
183	Kingsville, *Kleberg*	Miocene	1920	240	855,912	13,165						
184	Kittie, *Live Oak*	Jackson, Eoc	1944	60	39,609	13,095						
185	Kohler, *Duval*	Jackson, Eoc	1926	1,000	799,124	21,395						
186	Kohler, Deep, *Duval*	x	1936	40	x	6,830						
187	Koontz, *Victoria*	Frio, Olig	1944	120	126,780	17,336						
188	Kries, *Duval*	Mirando, Eoc	1940	200	324,898	24,269						
189	Lobbe, *Duval*	Jackson, Eoc	1934	230	649,309	17,555						
190	La Copita, *Starr*	Frio, Olig	1948	180	131,824	125,084						
191	Lacy, *Hidalgo*	Frio, Olig	1946	160	68,340	48,855						
192	La Gloria, *Jim Wells, Brooks*	Frio-Vicksburg, Olig	1939	4,500	9,937,626	3,507,830						
193	Lamar, *Aransas*		1948	160	22,284	15,922						
194	La Reforma, *Starr*	Frio-Vicksburg, Olig	1938	60	149,308	62,168						
195	La Rosa, *Refugio*	Frio-Vicksburg, Olig	1938	1,720	12,102,255	768,369						
196	La Rosa, N., *Refugio*	Frio, Olig	1943	80	112,211	6,669						
197	La Salle, *Jackson*	Frio, Olig	1944	320	480,980	80,984						
198	La Sal Vieja, *Willacy*	x	1949	40	18,025	18,025						
199	Las Animas, *Jim Hogg*	Cole, Eoc	1937	120	125,151	9,579						
200	Las Mujeres, *Jim Hogg*	Pettus, Eoc	1944	40	4,568	427						
201	La Ward, N., *Jackson*	Frio, Olig	1941	4,000	6,847,711	660,663						
202	Lefevre, *Jim Hogg*	Cole, Eoc	1945	100	36,525	8,856						
203	Little Kentucky, *Jackson*	Frio, Olig	1943	800	371,555	80,576						
204	Little Kentucky, N., *Jackson*	Frio, Olig	1949	40	2,001	2,001						
205	Lockhart, *Star*	Cockfield, Yegua, Eoc	1943	400	611,158	57,091						
206	Lolita, *Jackson*	Frio, Olig	1940	3,100	18,430,272	1,477,275						
207	Loma Novia, *Duval*	Jackson, Eoc	1934	7,410	34,886,381	943,730						
208	London, *Nueces*	Catahoula, Olig	1937	80	190,886	6,219						
209	London Gin, *Nueces*	Miocene	1949	400	54,133	54,133						
210	Longhorn, *Duval*	Cole, Gov't. Wells, Eoc	1938	1,000	3,747,686	104,939						
211	Longhorn, East, *Duval*	Pettus, Eoc	1945	300	1,314,701	186,834						
212	Longhorn, S., *Duval*	Pettus, Eoc	1948	320	149,605	68,220						
213	Long Matt, *East*	x	1948	520	675,663	557,593						
214	Lopez, *Webb*	Mirando, Eoc	1935	3,450	17,436,186	488,944						
215	Los Indios, *Hidalgo*	Frio, Olig	1944	320	84,772	28,415						
216	Los Olmos, *Starr*	Frio, Olig	1925	320	735,810	12,362						
217	Luby, *Nueces*	Catahoula, Frio, Olig	1937	3,000	15,160,646	577,055						
218	Lovio, *Duval*	Frio, Olig	1948	40	14,802	9,579						
219	Lundell, *Duval*	Cole, Eoc	1937	40	4,047,602	380,202						
220	McCullough, *Nueces*	x	1949	40	876	876				6.4		
221	McFaddin, *Victoria*	Frio, Olig	1930	1,000	15,539,326	1,178,219						
222	McFaddin, N., *Victoria*	Frio, Olig	1937	100	571,406	50,450						
223	McLean, *Webb*	Yegua, Eoc	1942	300	485,346	55,257						
224	McNeil, *Live Oak*	Hockley, Eoc	1934	180	338,490	6,427						
225	Magnolia City, *Jim Wells*	Frio, Olig	1939	300	605,889	25,518						
226	Magnolia City, N., *Jim Wells*	Frio, Olig	1943	700	2,978,336	404,378						
227	Manila, *Jim Hogg*	Pettus, Eoc	1940	230	403,599	1,472						
228	Mantor-Briggs, *Nueces*	Frio, Olig	1947	80	25,542	359						
229	Mariposa, *Brooks*	Vicksburg, Olig	1945	200	136,669	22,746						
230	Matagorda Bay, *Calhoun*	Miocene	1947	40	444,827	112,639						
231	Maurbro, *Jackson*	Frio, Olig	1941	3,275	5,064,989	464,695						
232	Mauritz, *Jackson*	Frio, Olig	1935	300	1,452,533	58,249						
233	Mauritz, East, *Jackson*	Frio, Olig	1944	200	93,759	12,643						
234	Mauritz, West, *Jackson*	Frio, Olig	1942	500	1,635,647	149,559						
235	Mayo, *Jackson*	Frio, Olig	1942	1,600	2,667,618	365,585						
236	Melbourne, *Calhoun*	x	1949	40	29,838	29,838				42.4		
237	Mercedes, Barroso Sd., *Hidalgo*	x	1948	40								
238	Mercedes, Seymour Sd., *Hidalgo*	x	1949	40	12,330	12,330						
239	Mercedes, Wade Sd., *Hidalgo*	x	1948	40								
240	Midway, *San Patricio*	Frio, Olig	1937	1,860	11,713,487	1,405,872						
241	Midway, Hoist, 5,600', *San Patricio*	x	1948	440	169,308	169,308						
242	Mineral, *Bee*	Wilcox, Eoc	1943	1,000	97,003	10,585						
243	Melon Creek, *Refugio*	Frio, Olig	1939	300	1,626,291	175,371						
244	Minnie Hock, *Nueces*	Catahoula, Olig	1939	1,500	6,148,308	540,807						
245	Minnie Hock, N., *Nueces*	Frio, Olig	1946	300	771,837	236,285						
246	Mirando City, *Webb*	McElroy, Cockfield, Eoc	1921	1,430	9,821,501	62,957						
247	Mirando Valley, *Webb*	McElroy, Cockfield, Eoc	1921	700	1,638,745	10,230						
248	Missouri River, *Victoria*	Frio, Olig	1938	380	2,654,412	66,006						
249	Muca, *Webb*	Mirando, Eoc	1932	100	1,485,348	39,326						
250	Mt. Lucas, *Live Oak*	Yegua, Olig	1923	160	438,960	14,098						

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION						DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT														
169	24	1			24					21		S	P	1,872	8	A F	Jackson	2,012
170	9		3	4	2					29		S	P	3,900	8	A F	Wilcox	4,020
171	1			1						45		S	P	3,925	x	x	x	x
172	5			5						36		S	P	5,654	5	A	Frio	10,002
173	1				1					62		S	P	5,408	13	x	x	9,919
174	21	13		21						41		S	P	6,110	7	x	x	7,505
175	80		5		75					39		S	P	4,800	10	A	Vicksburg	10,043
176	8	2			8					20		S	P	760	17	x	x	771
177	23			11	9	3				26		S	P	4,800	10	A	Vicksburg	10,043
178	179		93	71	14	1				44		S	P	4,714	20	A	Vicksburg	7,538
179	140	26		127	13					42		S	P	5,400	20	A	Vicksburg	10,008
180	12	2		12						45		S	P	3,800	12	x	Frio	4,319
181	133		86		47					21		S	P	1,920	13	M L	Yegua	3,011
182	7		4		3					22		S	P	2,046	15	M L	Yegua	3,060
183	22		19		3					21		S	P	1,400	20	D	Frio	7,265
184	3			1	2					21		S	P	1,432	10	F	Jackson	1,442
185	100		94		6					22		S	P	1,748	14	M L	Cook Mtn.	7,723
186	2				2					22		S	P	2,646	x	x	x	x
187	10			4		6				25		S	P	5,310	10	A	Vicksburg	7,020
188	10		1		9					31		S	P	3,300	12	M L	Yegua	4,732
189	31		24		7					25		S	P	1,872	12	M L	Yegua	4,054
190	9	7		6	2	1				41		S	P	6,950	12	x	Frio	7,003
191	6			3		3				34		S	P	7,455	5	F	Vicksburg	10,710
192	264	58		242	19	3	3,000			39		S	P	5,868	19	A	Vicksburg	9,000
193	4	2		4						38		S	P	7,386	10	x	x	7,625
194	9			7		2				42		S	P	5,917	25	A F	Vicksburg	7,010
195	98		38	56	12	2				42		S	P	5,360	175	A F	Vicksburg	9,177
196	5		2	1		2				39		S	P	5,460	12	A F	Vicksburg	9,203
197	16		1	8	6	1				25		S	P	5,562	15	x	Frio	7,636
198	2	2		2						39		S	P	8,329	7	x	x	8,814
199	11		5		6					19		S	P	1,782	22	M L	Yegua	4,114
200	1			1						43		S	P	5,127	7	F	Yegua	5,358
201	101			66	34	1				26		S	P	5,300	7	A F	Vicksburg	7,735
202	5				5					19		S	P	1,767	6	x	Jackson	2,005
203	7		2	5						35		S	P	5,700	10	x	Frio	6,850
204	1	1		1						34		S	P	5,678	5	x	Frio	5,835
205	15		3	8	4					46		S	P	3,600	8	A F	Yegua	4,600
206	229		1	143	80	5				29-33		S	P	5,200	9	D	Frio	7,280
207	758		376	1	381					23		S	P	2,550	20	M L	Cook Mtn.	4,200
208	4		3		1					24		S	P	4,689	8	S L	Frio	7,430
209	20	20		20						32		S	P	4,499	8	S L	Frio	7,636
210	54		37		17					45		S	P	4,009	10	A F	Yegua	6,011
211	23		5	9	9					46		S	P	5,840	5	S L	Yegua	5,923
212	9			5		1				43		S	P	5,780	7	x	Pettus	5,850
213	32	19		30		2				41		S	P	7,284	x	x	x	x
214	369		112		257					21		S	P	2,126	18	M L	Yegua	3,427
215	10		7	2		1				x		S	P		x	A F	Frio	8,506
216	110		44		66					20		S	P	2,250	17	M F	Yegua	2,612
217	159		44	96	18	1				37		S	P	4,300	15	A F	Frio	10,050
218	1				1					21		S	P	1,450	9	S L	Frio	1,464
219	110		9	20	81					19		S	P	1,500	10	M F	Yegua	2,750
220	1	1		1						38		S	P	5,538	10	x	x	5,594
221	102		23	36	40	3				20-40		S	P	4,400	15	A F	Frio	7,400
222	27		7	5		15				38-47		S	P	5,350	10	A	Frio	7,506
223	11		2		9					54		S	P	3,258	15	M L	Cook Mtn.	4,106
224	7		5	2						44		S	P	4,334	10	D	Cook Mtn.	6,216
225	17		11	1	2	3				42		S	P	5,436	9	A	Yegua	6,592
226	39		10	13	15	1				35		S	P	3,638	10	M L	Vicksburg	6,156
227	26		22	1	3					25		S	P	2,541	10	M L	Yegua	3,006
228	3			2		1				40		S	P	6,016	5	x	Frio	6,687
229	7		3	4						41		S	P	8,535	10	x	Vicksburg	9,105
230	13	9		13						27		S	P	4,970	8	x	Frio	11,530
231	88		1	64	21	2				24		S	P	5,220	10	D	Vicksburg	8,258
232	10		5	1	4					31		S	P	5,650	10	D	Vicksburg	7,808
233	14		9	4		1				31		S	P	5,654	10	D	Frio	7,160
234	15		2	10	3					34		S	P	5,470	10	D	Frio	6,760
235	150		107	27	15	1				29		S	P	5,100	10	D	Vicksburg	7,808
236	1	1		1						46		S	P	8,587	10	x	x	10,009
237	1			1						42		S	P	7,038	x	x	x	x
238	1	1		1						42		S	P	6,960	20	x	x	8,563
239	1				1					44		S	P	7,266	9	x	x	8,806
240	103			40	63					38		S	P	5,385	19	A F	Vicksburg	10,004
241	11			9	2					30		S	P	5,676	x	x	x	x
242	5		1	3		1				60		S	P	7,470	20	F	Wilcox	8,750
243	10		1	8	1					35		S	P	5,856	20	A	Frio	5,876
244	63		3	4	52	4				23		S	P	3,562	10	A F	Frio	7,530
245	37	19		20	16	1				50		S	P	5,990	15	F	Frio	10,000
246	295		264		31					20		S	P	1,530	10	M L	Mt. Selman	5,000
247	15				14	1				20		S	P	1,400	9	M L	Cook Mtn.	3,660
248	19			3	14	2				31		S	P	5,183	10	F	Vicksburg	9,225
249	12		1		11					21		S	P	900	10	M F	Yegua	2,278
250	17		10	2	3	2				22		S	P	5,390	10	S L	Frio	7,835

TABLE 1 – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTH TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION[c] CU FT TO END OF 1949	MILLION[c] CU FT DURING 1949		TO END OF 1949	DURING 1949
251	Monte Negro	x	1948	40	15,886	4,417						
252	Morgan, *San Patricio*	x	1949	160	41,699	34,911						
253	Mud Flats, *Aransas*	Frio, Olig	1949	40	304	304						
254	Murallo	x	1948	40	4,291	2,543						
255	Neuhaus, *Jim Hogg*	Pettus, Eoc	1941	280	105,303	5,600						
256	New Angelita, *San Patricio*	Frio, Olig	1947	40	16,541	3,630						
257	Nichols, *Hidalgo*	Frio, Olig	1940	280	581,461	14,942						
258	Nicholson, *Webb*	Wilcox, Eoc	1947	40	7,166	2,272						
259	Normanna, *Bee*	Yegua, Eoc	1930	70	132,653	4,435						
260	Oakville, *Live Oak*	Yegua, Cockfield, Eoc	1937	400	539,552	38,393						
261	Oakville, Wilcox, *Live Oak*	Wilcox, Eoc	1944	600	15,742	1,392						
262	O'Connor, McFaddin, *Refugio*	Catahoula, Olig	1931	150	680,531	10,655						
263	Odem, *San Patricio*	Frio, Olig	1939	2,200	5,363,559	507,707						
264	Odem, North	Frio, Olig	1944	40	x	865						
265	O'Hern, *Webb*	Cockfield, Eoc	1936	2,260	14,248,538	393,977						
266	Oilton, *Webb*	Mirando, Cockfield, Eoc	1937	525	1,924,361	18,362						
267	Orange Grove, *Jim Wells*	Frio, Olig	1940	1,040	3,459,675	148,478						
268	Palo Blanco, *Brooks*	x	1949	40	13,213	13,213						
269	Pantex, *Duval*	x	1948	300	130,157	130,157						
270	Petera, *Duval*	Gov't. Wells, Mirando, Eoc	1936	300	372,973	13,063						
271	Petera, E., *Duval*	Mirando, Eoc	1940	110	27,266	20,898						
272	Petronilla, *Nueces*	Frio, Olig	1941	480	1,019,448	111,851						
273	Pettus, *Bee*	Cockfield, Eoc	1929	1,200	10,459,963	190,981						
274	Pettus, New, *Bee*	Cockfield, Eoc	1934	1,000	4,550,177	142,358						
275	Pettus, N., *Bee*	Wilcox, Eoc	1942	400	267,603	7,026						
276	Piedre Lumbre, *Duval*	Gov't. Wells, Eoc	1935	1,350	8,004,993	450,083						
277	Piedras Pintas, *Duval*	Frio, Olig	1938	1,000	2,173,611	300,313						
278	Pita, *Brooks*	Vicksburg, Olig	1945	240	262,499	30,968						
279	Placedo, *Victoria*	Frio, Olig	1937	2,000	24,982,787	1,343,863						
280	Placedo, E., *Victoria*	Frio, Olig	1937	760	3,641,434	327,028						
281	Plummer, *Bee*	Cockfield, Eoc	1937	300	357,815	24,943						
282	Plymouth, *San Patricio*	Frio, Olig	1935	3,750	48,846,822	3,051,170						
283	Plymouth, E., *San Patricio*	x	1949	220	63,570	63,570						
284	Poehler, *Goliad*	Wilcox, Eoc	1946	240	282,604	43,079						
285	Pogarito Creek, *Duval*	x	1949	260	96,408	96,408						
286	Porter, *Karnes*	Pettus, Eoc	1943	400	1,307,229	173,303						
287	Premont, *Jim Wells*	Catahoula, Olig	1933	720	983,974	93,256						
288	Premont, E., *Jim Wells*	Frio, Olig	1947	80	206,980	98,987						
289	Pridham Lake, *Victoria*	Vicksburg, Olig	1944	300	1,027,818	277,012						
290	Pridham Lake, West, *Victoria*	Vicksburg, Olig	1946	640	886,016	221,223						
291	Princess Louise, *San Patricio*	x	1948	40	x	1,859						
292	Provident City, *Lavaca*	Yegua, Eoc	1948	120	86,032	32,516						
293	Provident City, E., *Lavaca*	Yegua, Eoc	1949	40	9,628	9,628				17.2		
294	Quien Sabe, *Webb*	Brennan, Eoc	1948	400	607,169	611,731						
295	Quinto Creek, *Jim Wells*	Frio, Olig	1942	300	240,138	20,638						
296	Rachal, *Brooks*	Frio, Olig	1945	40	22,443	3,225						
297	Rancho Solo, *Duval*	Cole, Gov't. Wells, Eoc	1935	440	402,006	6,236						
298	Rancho Solo, Ext., *Duval*	Cole, Eoc	1940	210	287,144	13,354						
299	Randado, *Jim Hogg*	Cole, Eoc	1926	765	5,271,480	54,376						
300	Rand Morgan, *Nueces*	Frio, Olig	1949	40	3,480	3,480				38.3		
301	Ray, *Bee*	Pettus, Eoc	1935	420	1,827,132	25,848						
302	Raymondville, *Willacy*	Frio, Olig	1945	80	66,812	10,703						
303	Realitos, E., *Duval*	Jackson, Eoc	1949	200	37,760	37,760				.65		
304	Refugio Fox, *Refugio*	Frio, Olig	1931	710	5,970,767	320,486						
305	Refugio, *Refugio*	Frio, Olig	1932	8,500	54,465,580	2,029,254						
306	Reynolds, *Jim Wells*	Frio, Olig	1939	690	2,157,794	76,329						
307	Richby, *Starr*	Frio, Olig	1937	150	299,121	18,480						
308	Ricardo, *Kleberg*	Frio, Olig	1945	80	59,623	-						
309	Richard King, *Nueces*	Frio-Vicksburg, Olig	1937	2,000	9,271,522	747,920						
310	Richardson, *Duval*	Jackson, Eoc	1944	160	47,250	6,430						
311	Rancon, *Starr*	Frio-Vicksburg, Olig	1938	4,500	19,996,100	1,528,110						
312	Rancon, N., *Starr*	Frio-Vicksburg, Olig	1940	1,200	3,016,107	351,452						
313	Rio Grande City, *Starr*	Frio, Olig	1932	200	504,803	4,790						
314	Rita, *Kennedy*		1949	40	62,904	62,904				.48		
315	Riverside, *Nueces*	Frio, Olig	1938	2,000	705,621	14,921						
316	Riverside, E., *Nueces*	Frio, Olig	1947	600	386,150	135,900						
317	Robinson, *Duval*	Yegua, Eoc	1944	140	577,818	116,014						
318	Robstown, *Nueces*	Frio, Olig	1939	200	355,408	86,198						
319	Roche, *Refugio*	Frio, Olig	1947	500	2,016,647	716,008						
320	Rooke, *Refugio*	Frio, Olig	1942	440	1,095,862	104,757						
321	Rosita, *Duval*	Yegua, Eoc	1944	80	101,888	x						
322	Ross, *Starr*	Frio, Olig	1943	1,000	1,808,903	192,955						
323	Round Lake, *San Patricio*	Frio, Olig	1946	40	41,452	33,743						
324	Rowden, *Duval*	Jackson, Eoc	1949	40	4,495	4,495				.06		
325	Rudson, *Bee*	Wilcox, Eoc	1949	60	24,432	24,432				7.46		
326	Runge, *Karnes*	Wilcox, Eoc	1943	560	837,848	59,320						
327	Salt Lake, *Aransas*	x	1948	60	x	31,634						
328	San Perdrice, *Hidalgo*	Frio, Olig	1934	1,600	7,918,072	33,042						
329	Sandy Creek		1948	160	x	121,584						
330	San Pablo, *Jim Hogg*		1948		x	430,945						
331	Santa Fe, *Brooks*		1949	40	2,643	2,643				60.0		
332	Santa Fe, S., *Hidalgo*	Frio, Olig	1949	40	1,915	1,915				.72		
333	Santon, *Webb*	Pettus	1949	40	2,269	2,269						
334	Sarita, *Kennedy*	x	1948	120	50,937	50,937						
335	Sarnoso, *Duval*	Gov't. Wells, Eoc	1932	600	3,241,001	64,399						

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT. NET	STRUCTURE[l]	NAME	DEPTH OF HOLE, FT.
251	4			3	1					38		S	P	7,054	x	x	x	x
252	4	1		1	1					37		S	P	6,788	11	x	x	9,269
253	1	1								33		S	P	9,342	12	A F	Frio	x
254	1			1						45		S	P	3,945	x	x	x	3,548
255	9		7		2					41		S	P	3,454	9	M F	Cockfield	7,500
256	2			1						34		S	P	5,976	12	F	Frio	5,482
257	15		13		2					35		S	P	3,122	9	A F	Yegua	5,816
258	1			1						38		S	P	5,574	6	x	Frio	5,038
259	4		1	1	2					24		S	P	3,500	17	D	Yegua	4,500
260	49		28	1	20					50		S	P	1,830	8	A F	Cook Mtn.	7,764
261	5		1	1		3				21		S	P	6,931	22	F	Wilcox	6,860
262	10		6	1	1					35		S	P	2,240	15	A F	Vicksburg	7,517
263	85		7	58	19	1				22		S	P	5,325	24	A F	Frio	
264	1				1					28		S	P	5,430	x	x	x	x
265	249		125		124					32		S	P	2,850	15	M F	Yegua	3,990
266	141		126		15					41		S	P	1,880	13	M L	Yegua	3,151
267	40		23	10	6	1				28		S	P	3,392	15	F	Vicksburg	6,012
268	2	2		2						23		S	P	3,605	5	x	x	3,616
269	15			10	4							S	P	2,593	x	x	x	x
270	24		19		5							S	P	1,750	13	M L	Cook Mtn.	4,004
271	11		1	1	9					23		S	P	2,557	x	x	x	x
272	18			16	2					40		S	P	6,952	9	F	Frio	10,000
273	91		67		24					44		S	P	3,900	19	F	Wilcox	8,993
274	35				15					47		S	P	3,670	9	F	Wilcox	8,045
275	10		1	1		5				60		S	P	6,943	35	F	Wilcox	9,045
276	144		40		104					22		S	P	1,324	10	M L	Wilcox	10,933
277	58		25	21	12					28		S	P	3,796	8	D S	Frio	5,595
278	6		1	4	1					49		S	P	8,174	6	x	Vicksburg	10,342
279	188		37	25	114	12				29		S	P	4,700	15	A F	Frio	7,242
280	37			36	4	4				38		S	P	6,000	10	A F	Frio	7,600
281	15		14	1						30		S	P	3,050	5	F	Cook Mtn.	4,756
282	206		34	135	32	5				31		S	P	5,458	10	A F	Vicksburg	9,452
283	11	11		11						30		S	P	5,129	8	x	x	5,645
284	11		1	7	2	1				51		S	P	8,319	10	F	Wilcox	8,360
285	13	13			13					24		S	P	2,515	x	x	x	x
286	17			11	5	1	1,680	830		48		S	P	3,950	10	A F	Wilcox	8,015
287	65		49	12	4					23		S	P	2,250	10	S L	Vicksburg	7,155
288	22	16		12	10					42		S	P	5,857	5	S L	Frio	6,010
289	29			28	1					24		S	P	4,470	4	D	Vicksburg	5,205
290	31	2		23	8					24		S	P	4,764	10	D	Vicksburg	4,815
291	1			1		3				35		S	P	5,380	x	x	x	x
292	5			2						45		S	P	8,720	8	x	x	x
293	2	2		2						45		S	P	6,110	13	A F	Yegua	6,157
294	43	21			43	6				21		S	P	2,337	14	S L	Miranda	2,703
295	10		3	1	1	1				29		S	P	4,860	13	S L	Vicksburg	5,900
296	3	1		1						52		S	P	6,100	12	x	Vicksburg	7,925
297	45		35		10					19		S	P	1,800	10	M L	Yegua	3,777
298	13		6	1	6					19		S	P	1,800	10	M L	Yegua	3,777
299	191		117		74					19		S	P	1,220	10	S L	Mt. Selman	5,222
300	1	1		1						47		S	P	5,388	6	S L	Vicksburg	5,425
301	42		37		5					46		S	P	3,920	15	F	Yegua	4,250
302	2		1	1						43		S	P	6,346	12	A F	Frio	6,985
303	7	7		7						46		S	P	4,179	5	S L	Yegua	5,837
304	35			27	6	2				36		S	P	3,500	10	F	Frio	7,688
305	571		380	143	44	4				23-40		S	P	3,700	15	F	Vicksburg	9,373
306	34		17	11	6					35		S	P	3,145	10	F	Yegua	6,026
307	17		5	1	11					21		S	P	1,270	5	F	Yegua	2,844
308	3			1		2				37		S	P	7,226	25	A F	Vicksburg	8,650
309	109		23	80	1	5				22-56		S	P	3,800	10	A F	Vicksburg	7,583
310	11		6		5					21		S	P	1,780	6	M L	Yegua	2,957
311	180		45	89	46					40		S	P	3,620	19	A	Vicksburg	8,580
312	51		1	26	21	3				42		S	P	4,111	14	A	Vicksburg	10,062
313	34		24		10					29		S	P	1,350	8	M L	Mt. Selman	2,827
314	1	1		1						43		S	P	7,076	x	x	x	11,382
315	22		20	2						41		S	P	5,000	15	A	Vicksburg	7,898
316	15		6	9						41		S	P	6,270	x	x	x	x
317	10			1	9					39		S	P	4,650	10	M F	Yegua	4,950
318	10		2	6	2					32		S	30	5,000	15	A F	Frio	7,525
319	48		11	48						38		S	P	6,809	10	x	Frio	6,818
320	22		7	15						39		S	P	7,135	15	A F	Vicksburg	8,551
321	3		1	2						36		S	P	3,940	10	x	Yegua	4,050
322	47		10	2	35					26		S	P	2,530	20	A	Jackson	5,908
323	4	2		4						39		S	P	5,442	13	F	Frio	5,889
324	1	1			1					25		S	P	2,155	8	x	x	2,806
325	3	3		2	1					37		S	P	7,019	6	F C	Wilcox	7,550
326	14		4	6	3		1			38		S	P	6,564	33	F	Wilcox	8,020
327	3			3						42		S	P	7,209	x	x	x	x
328	239		242		17					24		S	P	2,737	16	A F	Hockley	9,708
329	8			6	2					25		S	P	4,557	x	x	x	x
330	24			22	12					39		S	P	3,867	x	x	x	x
331	1	1								34		S	P	3,231	11	x	x	9,005
332	1	1		1						42		S	P	7,722	6	A	Vicksburg	10,125
333	1	1			1					21		S	P	2,559	5	S L	Yegua	3,141
334	6	6		6						41		S	P	6,967	6	x	x	8,848
335	57		28		31					21		S	P	2,390	15	S L	Yegua	4,073

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR SOUTH TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
336	Sarmoso, W., *Duval*	Jackson, Eoc	1949	40	1,034	1,034				1.7		
337	Sauet, Shallow, *Nueces*	Catahoula, Eoc	1923	3,850	36,829,808	820,265						
338	Sauet, Deep, *Nueces*	Frio, Olig	1935	2,450	31,399,828	398,964						
339	Schulz, *Live Oak*	Wilcox, Eoc	1949	40	65	65						
340	Schwartz, *Live Oak*	Vicksburg, Olig	1946	80	76,483	18,426						
341	Scott & Harper, *Brooks*	Frio, Olig	1944	240	436,414	64,819						
342	Seeligson, *Jim Wells*	Frio, Olig	1938	12,500	67,019,054	8,649,240						
343	Sejita, *Duval*	McElroy, Eoc	1939	1,000	2,633,152	283,275						
344	Semmes, *Starr*		1948	40	x	8,561						
345	Seven Sisters, *Duval*	Gov't. Wells, Eoc	1934	4,430	33,374,653	1,843,828						
346	Seven Sisters, S., *Duval*	Jackson, Eoc	1937	330	867,341	15,322						
347	Seventy-Six, *Duval*	Cole, Eoc	1947	40	7,477	524						
348	Sheriff, *Calhoun*	Frio, Olig	1945	640	1,542,219	394,004						
349	Shield, *Nueces*	Frio, Olig	1940	360	1,495,421	214,110						
350	Sinton, *San Patricio*	Frio, Olig	1934	200	123,735	10,979						
351	Sinton, N., *San Patricio*		1948	130	x	110,313						
352	Sinton, W., *San Patricio*	Frio, Olig	1944	200	710,954	217,590						
353	Sinton, W. Shallow, *San Pat.*		1948	370	x	286,927						
354	Slick-Wilcox, *Goliad*	Wilcox, Eoc	1943	1,880	8,332,519	1,054,746						
355	Sliva, *Bee*		1946	40	x	199						
356	Sommer, *Nueces*	Frio, Olig	1947	80	42,274	7,676						
357	Southland, *Duval*	Pettus, Eoc	1939	780	1,408,240	134,410						
358	Squire, *Duval*	Jackson, Eoc	1947	300	530,902	229,869						
359	Stagge, *Webb*	Yegua, Eoc	1948	80	41,691	6,147						
360	Stewart, *Jackson*	Frio, Olig	1942	350	757,854	74,572						
361	Strake, *Duval*	Jackson, Eoc	1943	160	664,661	48,959						
362	Stratton, *Kleberg, Nueces*	Frio, Olig	1937	11,000	26,898,515	3,175,855						
363	Sullivan City, *Hidalgo*	Frio, Olig	1939	700	1,448,656	70,319						
364	Sun, *Starr*	Frio, Olig	1938	2,400	8,471,334	757,805						
365	Sun, North, *Starr*	Frio, Olig	1941	1,000	2,673,788	442,530						
366	Sweden, *Duval*	Gov't. Wells, Eoc	1937	260	338,096	8,464						
367	Taft, *San Patricio*	Catahoula, Frio, Olig	1935	800	11,465,947	730,024						
368	Taft, East, *San Patricio*	Frio, Olig	1946	200	761,415	344,055						
369	Tarnecahua, *Duval*	Frio, Olig	1939	250	1,790,191	194,336						
370	Telefermer, *Victoria*	Frio, Olig	1938	100	50,650	4,479						
371	Telefermer, E., *Victoria*	Frio, Olig	1938	80	125,291	7,792						
372	Terrell Point, *Goliad*	Frio, Olig	1944	120	70,984	20,301						
373	Tesoro, *Duval*	Pettus, Yegua, Eoc	1938	140	256,252	2,568						
374	Thesis, *Bee*	Huckley, Eoc	1945	80	227,338	30,194						
375	Thomas-Lockhart, *Duval*	Jackson, Eoc	1937	300	254,437	18,177						
376	Tijerina-Canales, *Jim Wells*	Frio, Olig	1944	2,000	14,431,680	3,083,436						
377	Tom Graham, *Jim Wells*	Frio, Olig	1938	1,750	4,938,300	298,587						
378	Tom Graham, 5,600', *Jim Wells*		1949	80	19,508	19,508						
379	Tom O'Connor, *Refugio*	Frio, Olig	1934	12,000	146,310,960	12,150,220						
380	Tuleta, *Bee*	Jackson, Eoc	1932	1,160	2,152,652	11,810						
381	Tulaita, *Bee*	Cockfield, Eoc	1938	120	21,226	1,594						
382	Tulaita, Wilcox, *Bee*	Wilcox, Eoc	1945	600	2,065,051	460,769						
383	Turkey Creek, *Nueces*	Catahoula, Frio, Olig	1938	850	7,719,842	392,197						
384	Turkey Creek, 4,000', *Nueces*			x	x	112,146						
385	Tynan, *Bee*	Frio, Olig	1942	140	80,004	21,386						
386	Twello		1948		x	32,730						
387	Victoria, *Victoria*	Catahoula, Olig	1940	300	584,864	24,759						
388	Victoria, 4,600', *Victoria*		1949		74,636	74,636						
389	Victoria, 5,200', *Victoria*		1949		2,802	2,802						
390	Vienna, *Lavaca*	Wilcox, Eoc	1941	80	70,117	14,725						
391	Viola, *Nueces*	Frio, Olig	1947	40	110,897	47,352						
392	Volpe, *Webb*	Mirando, Eoc	1939	330	1,627,591	131,246						
393	Wade City, *Jim Wells*	Frio-Vicksburg, Olig	1939	2,000	7,680,727	393,303						
394	Watkins, *Webb*	Mirando, Eoc	1947	40	11,629	4,009						
395	Weestache, *Goliad*	Wilcox, Eoc	1944	60	24,193	2,291						
396	Weil, *Jim Hogg*	Pettus, Eoc	1943	240	459,803	48,538						
397	Welder, *Duval*	Jackson, Eoc	1944	100	78,308	10,550						
398	Welder, Minnie S.	Frio, Olig	1949	40	1,125	1,125						
399	West Ranch, *Jackson*	Frio, Olig	1938	10,300	59,389,946	5,049,329						
400	White Creek, *Live Oak*	Yegua, Eoc	1939	400	596,053	25,272						
401	White Creek, S., *Live Oak*	Yegua, Eoc	1941	100	291,498	11,912						
402	White Point, E., *San Patricio*	Frio, Olig	1938	5,140	39,635,050	2,682,211						
403	Willamar, *Hillary*	Frio, Olig	1940	6,400	30,205,149	2,381,062						
404	Williams, *San Patricio*	Frio, Olig	1945	220	849,983	185,158						
405	Woodsboro, *Refugio*	Frio, Olig	1941	300	802,178	62,064						
406	Word, *Lavaca*		1945	120	x	12,619						
407	Wyrick, *Refugio*	Frio, Olig	1947	120	217,617	68,276						
408	Yeager, *Jim Hogg*	Pettus, Eoc	1943	200	137,889	3,040						
409	Youngsen, *Bee*	Vicksburg, Olig	1944	600	536,888	111,716						
410	Yoward, *Bee*	Wilcox, Eoc	1947	300	934,373	446,459						
411	Yturria, *Starr*	Frio, Olig	1941	760	1,353,251	189,740						
412	Yzaguirre, *Starr*		1949	40	1,361	1,361						

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT./NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT
336	112	2		2						22		S	P	2,301	1	S L	Jackson	2,392
337	112		25	4	80	3				24		S	P	3,900	18	A F	Vicksburg	10,982
338	786		728	31	19	8				24-40		S	P	5,200	10	A F	Vicksburg	10,592
339	1	1		1								S	P	8,330	20	F C	Wilcox	9,500
340	3			2	1					23		S	P	4,018	3	x	Vicksburg	4,499
341	19		6	11	1	1				43		S	P	6,536	21	A F	Vicksburg	7,864
342	742	53		707	35					36-50		S	P	4,750	20	A	Vicksburg	9,024
343	55			37	2					44		S	P	5,334	17	A F	Yegua	7,095
344	2			2						23		S	P	2,454	x	x	x	x
345	465		104	1	338					23		S	P	1,232	23	A F	Yegua	4,404
346	33		19		14					22		S	P	1,487	9	A F	Yegua	3,100
347	1				1					22		S	P	1,318	17	x	Jackson	2,341
348	37			31	6					37		S	P	5,710	17	F	Frio	8,613
349	20		6	1	8	5				44		S	P	6,600	12	A	Frio	7,806
350	14		12	1		1				36		S	P	3,260	22	A	Frio	7,438
351	13			8	5					21		S	P	2,340	x	x	x	x
352	39		23	14	2					36		S	P	5,430	15	A	Frio	7,247
353	37			15	22					20		S	P	2,521	x	x	x	x
354	54	2		35	12	2				36		S	P	7,560	x	F	Wilcox	8,989
355	1				1					49		S	P	4,556	x	x	x	x
356	3			1	1	1				36		S	P	5,892	10	x	Frio	7,008
357	37		19	11	5	2				44		S	P	5,289	10	A F	Yegua	6,015
358	20	2		20						25		S	P	3,274	15		Jackson	3,977
359	2				2					38		S	P	2,800	10	F	Jackson	3,515
360	12		2	5	3	2				26		S	P	4,950	20	F	Frio	7,508
361	8		1		7					23		S	P	3,180	5	F	Yegua	4,010
362	355		64	274	17					43		S	P	6,320	50	A	Vicksburg	8,138
363	39		23	12	3	1				25		S	P	3,300	15	A F	Mt. Selman	9,708
364	94		12	78	12	2				45		S	P	3,900	10	A	Yegua	12,188
365	41			34	7					45		S	P	4,500	15	A	Vicksburg	6,995
366	24		22		1	1				43		S	P	5,100	10	A F	Yegua	7,005
367	81		7	25	49					49		S	P	3,975	20	M F	Frio	6,926
368	33	2		24	9					21		S	P	5,402	5	M F	Frio	5,640
369	36			2	34					21		S	P	2,050	15	A F	Yegua	3,461
370	6		4	1	1					28		S	P	2,693	5	F	Cook Mtn.	7,680
371	3		1	2						32		S	P	4,880	10	F	Vicksburg	6,614
372	5			3	2					24		S	P	4,650	x	S L	Frio	5,010
373	8		6	1		1				47		S	P	4,828	15	F	Yegua	5,541
374	7		1		6					36		S	P	3,575	9	F	Hockley	3,587
375	15		8	1	6					43		S	P	3,960	10	S L	Cook Mtn.	6,012
376	179	6		178	1					40		S	P	7,108	15	F	Vicksburg	8,029
377	53		22	27	4					42		S	P	3,480	55	A F	Vicksburg	5,760
378	2	2		2						42		S	P	5,627	x	x	x	x
379	639			636	3					35		S	P	5,600	175	A F	Vicksburg	8,174
380	77	70			7					39		S	P	3,065	11	F	Wilcox	9,200
381	12	11			1					45		S	P	3,632	10	F	Flettus	3,635
382	44	2		32	7	3				37		S	P	7,030	38	F	Wilcox	7,504
383	60		30	26	4					38		S	P	3,860	8	F	Frio	7,511
384	6			6	6					38		S	P	4,050	x	x	x	x
385	5		3	2						45		S	P	4,109	10	F	Frio	4,762
386	1			1	1					44		S	P	4,858	x	x	x	x
387	26		19	1	6					22		S	P	2,556	10	F	Vicksburg	5,252
388	4			4						32		S	P	4,600	x	x	x	x
389	2			2						10		S	P	5,200	x	x	x	x
390	3			2		1				33		S	P	8,460	18	F	Wilcox	11,557
391	2	1		1	1					35		S	P	5,530	22	x	Frio	9,014
392	34		7		27					21		S	P	2,430	12	M L	Yegua	3,717
393	107		54	11	40	2				32		S	P	4,800	10	F	Yegua	5,410
394	3				3					22		S	P	880	11	x	Jackson	891
395	3				1	2				35		S	P	7,979	15	F	Wilcox	9,002
396	7		2	5						46		S	P	5,050	10	F	Yegua	5,806
397	5		1		4					25		S	P	2,089	7	F	Yegua	3,115
398	1	1		1						33		S	P	5,898	8	A	U. Vicksburg	x
399	505	35		446	58	1				40		S	P	5,000	24	F	Vicksburg	9,587
400	35		0	1	28					21		S	P	1,400	8	S L	Yegua	1,785
401	7		1		6					21		S	P	1,814	8	S L	Jackson	3,382
402	271		23	194	48	2				39		S	P	3,500	17	A F	Vicksburg	8,383
403	130	2		198	32					30		S	P	7,900	40	A F	Frio	2,010
404	18	3		11	3	4				32		S	P	4,553	6	x	Vicksburg	6,226
405	11		4	7						40		S	P	5,400	5	F	Frio	8,658
406	6			2	1					39		S	P	5,867	x	x	x	x
407	6			3	3					40		S	P	4,944	10	x	Frio	6,395
408	8		5		3					36		S	P	3,750	10	A	Yegua	3,871
409	25	2		25						21		S	P	3,794	30	F	Vicksburg	4,265
410	19	6		19						41		S	P	7,470	23	x	Wilcox	8,500
411	23		5	12	6					42		S	P	4,230	30	M L	Jackson	9,602
412	1	1		1						48		S	P	4,890	52	x	x	8,974

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY	FIELD	LOCATION	TOTAL DEPTH	FORMATION	DRILLED BY	INITIAL PRODUCTION PER DAY: OIL, U.S. BBL.	INITIAL PRODUCTION PER DAY: GAS, MILLIONS CU. FT.	INITIAL PRODUCTION PER DAY: CONDENSATE U.S. BBL.	CHOKE, FRACTIONS OF AN INCH	PRESSURE, LBS. PER SQ. IN.: CASING	PRESSURE, LBS. PER SQ. IN.: TUBING	REMARKS
1	Aransas	Mud Flats	On Aransas-San Patricio Co. Line, 8½ mi. N-NE of Gregory Townsite.	9,269	Frio, 9,242	George W. Graham	192	2.44		3/16	Sealed	2,800	
2	Bee	Blaconia, E	8½ mi. SE Blaconia Fld. Jas. S Wm. St. John Survey	5,455	Frio, 5,249	W. R. Quinn	80			1/4	700	300	
3		Goree	2 mi. SW Mineral in Thomas Burton Survey A-83	8,201	Wilcox, 7,199	Skelly Oil Co.	61			7/64	2,250	1,300	
4		Hudson	Thos. B. Reese A-291, 6 mi. SW of Mineral	7,550	Wilcox, 7,019	Pudco Oil & Gas Co.	90			3/8	Sealed	350	
5	Brooks	Flowella	Loma Blanca Gr., 3 mi. NE of Falfurrias	8,810	Frio-Vicksburg	Amerada Petr. Corp.		6.4		Open	2,500*		
6		Santa Fe	San Salvador De Tule, 6½ mi. SE of Encino	9,005	7,345 3,231	Humble O & R Co.	21.6			1/8		1,070	
7		Viboras	1,980' E & 1,980' S from SW Corner Survey #62	10,385	Frio, 8,110	Humble O & R Co.		1.2	25	1/4	1,975*		
8	Calhoun	Heyser, E	S A & M G B & B Survey #6, 3 mi NE of Heyser Field	9,105	Frio, 5,750	John W. Mecom		Shut In			2,700*		
9		Minnie S. Selder	Jose Marie Fios A-32, 4½ mi SW of Bloomington	8,203	Frio, 5,898	John W. Mecom	131			1/8	Sealed	1,100	
10	Duval	Cedro Hill, W	12 mi. SW of Freer, Survey #196, Blk. 10	2,303	Jackson, 1,413	Magnolia Petr. Co.		16		Open	304*		
11		Charambusca, W	2½ mi. NW of Charambusca Fld in Juan L. Saenz Sur. 154	2,295	Jackson, 1,832	J. W. Gorman & W. A. Richardson		27		Open	760*		
12		Chiltipin, N	8½ mi. NW Chiltipin Field in SA & MG #2, A 529	4,705	Jackson, 4,151	W. L. Goldston	100			1/8	750	640	
13		Cocanon	10 mi. W of Realitos in HS & F Survey 462	3,700	Pettus, 3,575	Cox & Hamon	50			1/4			
14		El. Mesquite, S	5 mi. NW Hebronville in GC & SF Survey 171, A 861	3,217	Jackson, 3,057	Jergens Oil Co.	95			1/4	500	50	
15		Diego	5 mi. N-NW of San Diego in San Diego De Arriba Gr.	5,004	Jackson, 4,730	Humble O & R Co.	125			1/8	Sealed	910	
16		Forty-Nine	7½ mi. SW Freer in GH & CNGRR Survey #49, A-715	2,622	Jackson, 1,574	The Texas Co.	19			Pump			
17		Realitos, E	3½ mi. SE Realitos in Santos Garcia Grant	5,837	Jackson, 4,179	Southern Minerals	52	37.5		9/64	1470	210	
18		Rowden	1½ mi. SW Freer in F. E. Stearns Survey #184, E ½	2,806	Jackson, 2,155	Gasoline Prod. Corp.	61			Pump			
19		Saranosa, W	9 mi. SW Freer in B. Elizondo Survey, #668, A-1838	2,392	Jackson, 2,269	Magnolia Petr. Co.	30			8/64	775	400	
20	Goliad	Angel City		9,014	Wilcox, 8,042	Stanolind O & G Co.	67	43.3		17/64			
21		Breeden	2 mi. SE of Weesatche in Joseph Simmons Survey A-253	8,200	Yegua, 4,648	Sunray Oil Co.		10.8		Open	1,815*		
22		Boyce, W	3 mi. NE of Charco in M. De Jesus F'Barbo Survey	7,898	Wilcox, 7,272	Hassie Hunt Trust			No Gauge	1/4		2,000	Dual Completion
23		Charco, N	8½ mi. NW of Charco in Victor Blanco Grant A-7	9,277	Pettus, 4,208 Wilcox, 8,660	W. L. Goldston	113	18.0		1/8 Open	3,425*		
24		Fannin, E	2 mi. SE of Fannin Townsite in Juan Bener Survey	4,815	Frio, 3,721	Placid Oil Co.	85			1/4	1,450	400	
25		Hordes Creek, N	1 mi. N of Hordes Creek Fld. in W.D. Sutherland Survey A-268	9,005	Wilcox, 7,655	Humble O & R Co.	97	4.4		1/4	2,375*		
26		Sarco Creek, W	11 mi. S of Goliad in A. Devereaux Survey A-16	5,183	Frio, 4,240	Ginther, Warden & Ginther		79.0		Open			
27	Hidalgo	Donna	6½ mi. S-SW of Alamo in Los Torritos, Santa Anna & El Gato Grants, Blk. 16	9,215	Frio, 6,575	Sinclair O & R Co. 20 bbl Dist.		8.4			2,610*		
28		Edinburg	2 mi. SW of Edinburg, Parc. 68, Blk. 1	11,246	L. Frio, 7,580	Magnolia & Sinclair		15.0		Open	3,012*		
29		Pharr	¼ mi. S of Pharr in Kelly-Pharr Subdvn., Tract #205	10,395	Frio, 9,370	Coastal Refining 94 Dist.		4.8			6,900*		
30		Santa Fe, S	11 mi. S of Encino in San Salvador Del Tule Grant	10,125	Frio, 7,722	Humble O & R Co.	73			3/32		1,225	
31	Jackson	Cordelle, E	8 mi. NW of Ganado in I & GN Survey A-198, #5	5,516	Miocene, 2,763	P. R. Rutherfor & Texas Co.		94.0		Open		1,175	
32		Little Kentucky, North	½ mi. N of Little Kentucky Field in J.A. Pearce A-300	5,835		Gulf South Oil Corp.	113			1/8	850	650	
33	Jim Hogg	Edlaster	25 mi. SW of Hebbronville, Survey #270	2,573	Yegua, 2,043 2,096	Gorman & DeLange	13	16.0		Open 9/64	515	250	
34	Jim Wells	Palo Blanco	1 mi. SE of Alfred in SP&H Survey #17, A-494	5,700	Frio, 3,353	The Texas Co.	61			Pump			
35	Kenedy	Pita	16 mi. S-SW of Sarita in Los Pinados Grant	11,282	7,076	Humble O & R Co.	270			5/16	Sealed	750	
36	Kleberg	Laguna Large	16 mi. S of Corpus Christi in Laureles Farm Tr. #123	12,005	Frio, 6,497	Humble O & R Co.		35.0	280		2,522*		
37	Lavaca	Provident City, E	1 mi. E of Provident City Field in Wm. Bell Survey	6,158	Yegua, 6,110	Great Lakes Carbon Co.	103			1/8		1,490	
38		Seclusion	3½ mi. SE of Speaks Field in A. S. White Survey A-56	6,600	Yegua, 6,044	Production Service Co.		48.0		Open	Sealed	225	

* Sealed In Pressure

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY	FIELD	LOCATION	TOTAL DEPTH	FORMATION	DRILLED BY	INITIAL PRODUCTION PER DAY: OIL, U.S. BBL.	INITIAL PRODUCTION PER DAY: GAS, MILLIONS CU. FT.	INITIAL PRODUCTION PER DAY: CONDENSATE, U.S. BBL.	CHOKE, FRACTIONS OF AN INCH	PRESSURE LB. PER SQ. IN.: CASING	PRESSURE LB. PER SQ. IN.: TUBING	REMARKS
39		Speaks, S W	3 mi. SW Speaks Field in J. Chesler Survey, A-113	9,331	Frio, 3,348	H. L. Hunt		14.0		Open	1,500*		
40	Live Oak	Goebel, N	4 mi. NE of Oakville in Refugio CSL #16, Blk. 4	7,153	Wilcox, 6,674	Henderson-Coquat	50			12/64	870	560	
41		Karon	2¼ mi. E of Coquat Field in J. Poitevent Survey #37	8,545	Wilcox, 8,180	Tide Water Ass. Oil Co.		3.8	108	1/4	3,026	2,600	
42		Schulz	5½ mi. N of Three Rivers in John Hefferman Survey	9,300	Wilcox, 8,320	Argo Oil Corp.		.125	13	8/64	700	400	
53	Nueces	Bailey	Agua Dulce Farm Lots, Sec. 36	6,040	5,960	Producers Development Co.	102			3/32	2,125	1,625	
44		London Gas	6½ mi. S of Clarkwood in Laureles Farm Trs. Sec. 1	7,616	Miocene, 4,499	Grace Oil Co.	75			1/8	265	200	
45		Mustang Island	12 mi. S of Aransas pass in Corpus Christi Bay	9,526	Frio, 7,432	Atlantic Refining Co.	46			9/64	Sealed	25	
46		Rand Morgan	8 mi. N of Agua Dulce in Blk. 3	5,425	Frio, 5,388	Rand Morgan	57			9/64	Sealed	650	
47	Starr	Bloomberg	11 mi. NE of Grulla in Xavier Zamora Parc. #41, A-88	6,849	L. Frio, 4,030	The Texas Co.		73.0		Open			
48		Buena Vista	½ mi. SE of Buena Vista Survey, La Sacatosa Grant	1,800	Pettus, 1,761	Clark Fuel Prod. Co.	33			3/16	Sealed	400	
49		El Benito	2½ mi. N-NE of Flores Gas Field in El Panal Grant	7,206	Vicksburg, 7,080	Baldridge & King		10.0	100		3,832		
50		Gregg Wood	4 mi. NE of Rio Grande City, Parc. 84	1,321	Frio, 1,315	D. G. Wood	23			Pump			
51		Lockhart, SE	10 mi. NE of Rio Grande City, Parc. 80	4,065	Pettus, 4,034	I. K. Howeth	72			3/16	1,125	650	
52		Reynaga	Finals S of Reynaga 1	1,201	Jackson, 1,130	A & T Drilling Co.		12.5		Open			
53	Victoria	McFaddin, E	NE Corner of C. O. Edwards Survey	6,402	Frio, 5,985	Union Prod. Co.	120			1/8	995	795	
54		Mission Valley, W	7 mi. SW of Mission Valley in B. J. White A-354	9,074	Wilcox, 8,895	Western Natural Gas Co.	50	14.5		1/4	1,300		
55		Ben Shelton	Mrs. Ben Shelton 1-B	7,979	Frio, 7,428	P. R. Rutherford & Hein	161	[Open]		1/8			
56	Webb	Santos	De Los Santos Estate 1	3,141	Pettus, 2,559	Killiam & Hurd, Inc.	100			Pump			
57	Willacy	La Sal Vieja	Narcisso Tract #4 in San Juan De Carricitos Grant Lot 2, Blk. 4	8,814	8,330	J. S. Abercrombie Co.	184			12/64	Sealed	1,300	
58	Wilson	Saspamco	3 mi. SW of Saspamco in Jose De La Garza	2,953	Austin Chalk, 2,840	W. R. Quinn	631			1*	220	25	
59	Zapata	Ganso De Mayo	Parc. 30, Blk. 2 & 4	6,515	Queen City, 2,300	W. B. Jayred		3.5		Open			

* Sealed In Preasure

	IN PROVEN FIELDS	WILDCATS
Number Wells Drilling Dec. 31, 1949	208	88
Number Oil Wells Completed During 1949	172	62
Number Gas Wells Completed During 1949	291	472
Number Dry Holes Completed During 1949		

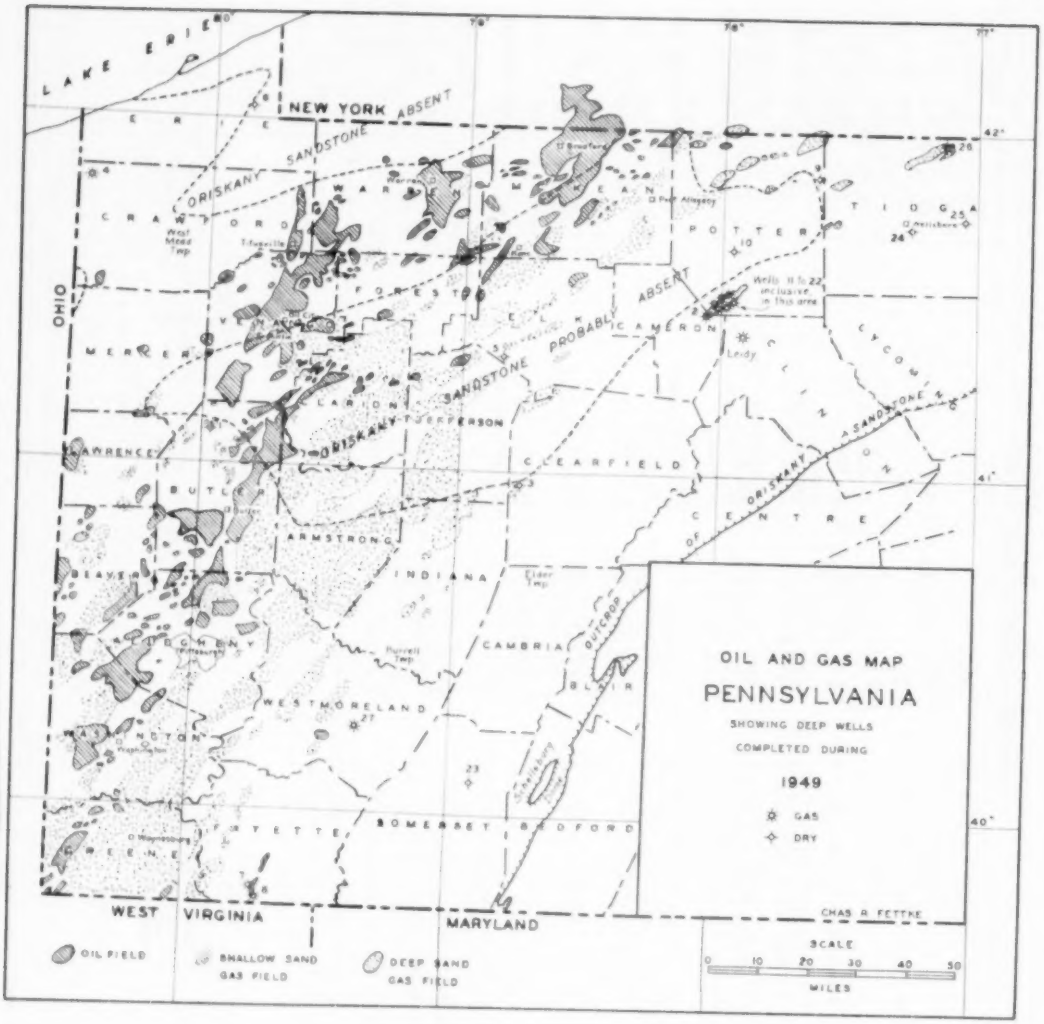
LAKE ERIE
NEW YORK ABSENT
ORISKANY SANDSTONE
ORISKANY SANDSTONE PROBABLY ABSENT
OHIO
WEST VIRGINIA
MARYLAND
OIL AND GAS MAP
PENNSYLVANIA
SHOWING DEEP WELLS
COMPLETED DURING
1949
GAS
DRY
CHAS R FETTKE
OIL FIELD
SHALLOW SAND GAS FIELD
DEEP SAND GAS FIELD
SCALE
0 10 20 30 40 50
MILES

FIG. 1

Oil And Gas Developments In Pennsylvania During 1949

By CHAS. R. FETTKE,** Member AIME

A marked decline occurred in drilling activity in the shallow-sand territory of Western Pennsylvania (Upper Devonian or higher) during 1949. In all, 2,017 wells were completed, as compared with 3,284 in 1948. Of these, 430 were gas wells, 53 were oil wells, 179 were dry holes, 37 were drilled for gas storage, and 1,318 were drilled in connection with secondary-recovery oil operations. Twenty-seven deep wells (Middle Devonian or deeper) were completed in 1949. Sixteen of these were gas wells, one was drilled for gas storage, and ten were dry holes.

SHALLOW-SAND DEVELOPMENTS

Shallow-sand well completions in Western Pennsylvania, exclusive of those drilled in connection with underground gas storage and secondary-recovery oil operations, are shown in Table 1. During 1949, 662 such wells were drilled, of which 65 per cent were gas wells, 8 per cent were oil wells, and 27 per cent were dry holes. The 430 new gas wells had a total initial open-flow capacity of 93,405,000 cu ft per day, as compared with the total initial open-flow capacity of 102,615,000 cu ft of the 481 new gas wells completed in 1948. The 53 new oil wells had a total initial production of 260 B/D, as compared with the total initial production of 286 bbl of the 113 new oil wells completed in 1948. The results obtained in 1949 by deepening 67 shallow-sand wells are shown in Table 2.

The three columnar sections appearing in Figure 2 show the stratigraphic positions of the Upper Devonian and higher oil and gas sands of Western Pennsylvania from southwest to northeast along the trend of the producing belt shown in Figure 1.

OIL

The average daily oil production of Pennsylvania in 1949 was 31,347 bbl, as compared with 35,206 bbl in 1948, a decline of 11per cent. In the Bradford Oil Field, which includes the Bradford, Guffey, and Burning Well pools, 1,200 new wells were drilled, about half of which were water-intake wells, as compared with 2,270 in 1948, a decrease of 47 per cent. Oil production in this field, 86 per cent of whose area is in Pennsylvania, decreased from a daily average of 30,529 bbl in 1948 to 26,804 in 1949, or 12 per cent. Of the new wells, 1,100 were located in the Pennsylvania part of the field, and this part contributed 24,674 bbl of the daily average production. This represents 79 per cent of the total oil production of the state. The relations between production and drilling activity and crude oil prices in the Bradford Field are shown in Figure 3. Eight water-intake wells and nine oil wells were completed in connection with secondary recovery operations in the Coryville Pool of Eastern McKean County.

In the Kane-Clarendon area of Southwestern McKean County and Eastern Warren County, 119 wells were completed in 1949, mostly in connection with water-flooding projects in the Clarendon Pool of East-Central Warren County. In the Venango district of Northern Venango County and Southwestern Warren County, 82 wells were drilled in 1949, as compared with 118 in 1948, a decrease of 31 per cent. Of these, 40 were air-intake wells and 42 were oil wells. Oil production in the middle and southwestern districts of Pennsylvania decreased from a daily average of 7,005 bbl in 1948 to 6,673 bbl in 1949, or 5 per cent.

The decline in production and drilling activity in the Pennsylvania oil fields during 1949 can be attributed largely to market conditions. The price of Bradford crude dropped from $4.50 per bbl at the beginning of the year to $3.27 on June 16. On December 12, it was raised to $3.54. No new oil fields or pools were discovered in Pennsylvania during 1949.

GAS

Pennsylvania produced 70 billion cu ft of gas in 1949, as compared with 74.6 billion cu ft in 1948. Three new shallow-sand gas fields were discovered, as follows: one in Elder Township, Cambria County; one in West Mead Township, Crawford County; and one in Burrell Township, Indiana County. Of the three, only the latter will probably prove locally significant. In addition, five new small gas pools were opened, as follows: one in Conemaugh Township, Indiana County; one in Clover Township, Jefferson County; one in Cecil Township, Washington County; and one each in Loyalhanna and South Huntington Townships, Westmoreland County. Amwell and West Bethlehem Townships in the southern part of Washington County were the most active areas in the shallow-sand gas territory. Although no new pools were discovered in this area, old ones were extended appreciably by drilling additional wells and deepening some of the already existing wells.

Three wells, averaging 3,115 ft in depth, were drilled for underground gas storage in Allegheny County; 12, averaging 1,594 ft, in Clarion County; 6, averaging 1,971 ft, in Greene County; and 16, averaging 2,583 ft, in Washington County.

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MANUSCRIPT RECEIVED IN THE OFFICE OF THE INSTITUTE OCTOBER, 1950.

DEEP SAND DEVELOPMENTS

The results of deep drilling in Western Pennsylvania during 1949 are summarized in Table 3. The locations of the wells are shown on the map in Figure 1 and the stratigraphic positions of the deeper sands in Figure 4. Of the 27 wells completed, 16 were gas wells, 1 was drilled for gas storage, and 10 were dry holes. One new deep-sand gas field was discovered. The annual rate of deep-sand exploration and development since the discovery of the Tioga Field in 1930, the first deep-sand field to be opened in Pennsylvania, is shown in Figure 5. Of the cumulative total production of 6,096 billion cu ft of gas in Pennsylvania at the end of 1949, 350 billion cu ft were obtained from the deep sands. No commercial oil production has yet been developed in them.

In 1949, the greatest deep-sand activity centered in the East Fork-Wharton Oriskany sand pool in Southern Potter County where 13 wells were completed, whose initial open-flow capacities totaled 60.5 million cu ft of gas per day and ranged from 165 thousand to 22 million cu ft. The pool, as now developed, extends 9½ miles along the axis of the Marshlands anticline and has a maximum width of about 4,000 ft.

Two small gas wells were completed in the Onondaga chert in the South Summit Field of Southern Fayette County. One of these, the W. R. Barton Estate No. 8, was drilled into the Salina formation to a total depth of 10,312 ft. The presence of an abnormally thick Upper Silurian section was revealed. This well is now the deepest in Pennsylvania and the Appalachian province and also has the distinction of being the deepest well in the world to be drilled entirely with cable tools.

The William Piper Well No. 1 in Unity Township, Westmoreland County, although small, may lead to the development of another Onondaga chert gas field along the Chestnut Ridge anticline. The well is located about 30 miles northeast of the North Summit Field on the same anticline. The discovery, therefore, should stimulate further prospecting along this anticline in the intervening area.

The Alice Irwin Well No. 10 in Bell Township, Clearfield County, helped define the southeastern border of a large area in Northwestern Pennsylvania in which no sandstone occurs at the Oriskany horizon. Only 2 ft of quartz-

TABLE 1 - SHALLOW-SAND WELL COMPLETION IN PENNSYLVANIA IN 1949 *

COUNTY	COMPLETIONS		GAS			OIL			DRY	
	NUMBER OF WELLS	AVERAGE TOTAL DEPTH (FEET)	NUMBER OF WELLS	AVERAGE INITIAL OPEN-FLOW (MMCF PER DAY)	AVERAGE TOTAL DEPTH (FEET)	NUMBER OF WELLS	AVERAGE INITIAL PRODUCTION (B/D)	AVERAGE TOTAL DEPTH (FEET)	NUMBER OF WELLS	AVERAGE TOTAL DEPTH (FEET)
Allegheny	19	2,642	11	445	2,600	2	1.5	1,913	6	2,960
Armstrong	108	2,968	91	127	2,000	1	3.0	1,090	16	2,900
Beaver	3	1,945	-	-	-	1	0.5	2,355	2	1,740
Butler	74	1,732	20	639	1,884	36	2.9	1,533	18	1,960
Cambria	2	4,269	1	44	5,261	-	-	-	1	3,276
Clarion	24	1,741	18	72	2,060	-	-	-	6	1,116
Clearfield	10	3,067	6	183	2,926	-	-	-	4	3,280
Crawford	2	982	1	20	815	-	-	-	1	1,149
Elk	23	2,293	14	122	2,409	1	3.0	2,250	8	2,095
Fayette	19	2,424	10	295	2,397	1	4.0	2,600	8	2,436
Forest	8	1,812	3	131	1,796	-	-	-	5	1,821
Greene	18	2,047	13	254	1,925	-	-	-	5	2,383
Indiana	55	3,010	34	251	2,712	-	-	-	21	3,491
Jefferson	62	2,892	42	237	2,805	-	-	-	20	3,075
McKean	99	1,985	77	74	2,013	5	18.9	1,614	17	1,969
Potter	8	2,088	4	40	1,988	-	-	-	4	2,188
Venango	1	1,961	1	19	1,961	-	-	-	-	-
Warren	10	1,595	6	47	1,701	3	1.0	850	1	3,192
Washington	72	2,627	44	516	2,624	3	15.0	2,683	25	2,626
Westmoreland	45	2,945	34	181	2,742	-	-	-	11	3,574
TOTAL	662	2,474	430	217	2,516	53	4.9	1,623	179	2,624

* Does not include wells drilled in connection with underground gas storage or secondary recovery oil operations.

itic sandstone were encountered on top of 34 ft of very silty and fossiliferous limestone. The Danforth Well No. 41 in Spring Township, Elk County, located in the middle of this area, encountered no sandstone.

The R. F. Grove Well No. 1 in Shade Township, Somerset County, located on a low dome on the Negro Mountain anticline, passed through a thick section of Oriskany sandstone but encountered only a show of salt water in it.

The Arthur Brook Well No. 1 in Charleston Township, Tioga County and the Chas. Bolt No. 1 in Covington Township in the same county, represent two more unsuccessful Oriskany tests on the Wellsboro anticline.

The Alfa Cozadd Well No. 1in Beaver Township, Crawford County, was the only Lower Silurian test completed in Pennsylvania in 1949. It encountered a show of gas in the Thorold sandstone at the top of the Albion Series.

The Ordovician test on the Schellsburg dome, east of the Allegheny Front in Napier Township, Bedford County in South-Central Pennsylvania, had not reached its objective at the end of the year.

A significant discovery of gas in the Oriskany sandstone was made in Leidy Township, Clinton County, in North-Central Pennsylvania on January 8, 1950. The Dorsey Calhoun Well No. 1 of the Leidy Prospecting Company, a wildcat well, on a dome along the Wellsboro anticline, encountered gas in the Oriskany sandstone at a depth of 5,659 ft. The potential initial open-flow is estimated to be 10 to 15 million cu ft per day and the reservoir pressure, 4,200 psi. The well is located about 10 miles southeast of the East Fork-Wharton Pool. The discovery has focused attention on the belt lying between the area in which the sandstone is absent and the outcrop, Figure 1, and has stimulated considerable activity.

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TABLE 2 - SHALLOW-SAND WELLS DEEPENED IN 1949

COUNTY	TOTAL		GAS			OIL			DRY	
	NUMBER OF WELLS	AVERAGE AMOUNT DEEPENED (FEET)	NUMBER OF WELLS	AVERAGE INITIAL OPEN-FLOW (MMCF PER DAY)	AVERAGE AMOUNT DEEPENED (FEET)	NUMBER OF WELLS	AVERAGE INITIAL PRODUCTION (B/D)	AVERAGE AMOUNT DEEPENED (FEET)	NUMBER OF WELLS	AVERAGE AMOUNT DEEPENED (FEET)
Allegheny	1	835	-	-	-	-	-	-	1	835
Armstrong	25	1,110	19	121	1,307	-	-	-	6	487
Butler	5	413	-	-	-	2	4.5	786	3	165
Clarion	2	1,574	2	40	1,574	-	-	-	-	-
Fayette	1	553	1	200	553	-	-	-	-	-
Greene	9	786	3	109	1,171	-	-	-	6	594
Indiana	2	1,980	1	20	1,948	-	-	-	1	2,012
Jefferson	4	1,203	2	60	1,757	-	-	-	2	650
McKean	3	779	1	40	840	-	-	-	2	748
Washington	12	1,172	10	895	1,117	-	-	-	2	1,445
Westmoreland	3	962	3	40	962	-	-	-	-	-
TOTAL	67	1,037	42	289	1,248	2	4.5	786	23	675

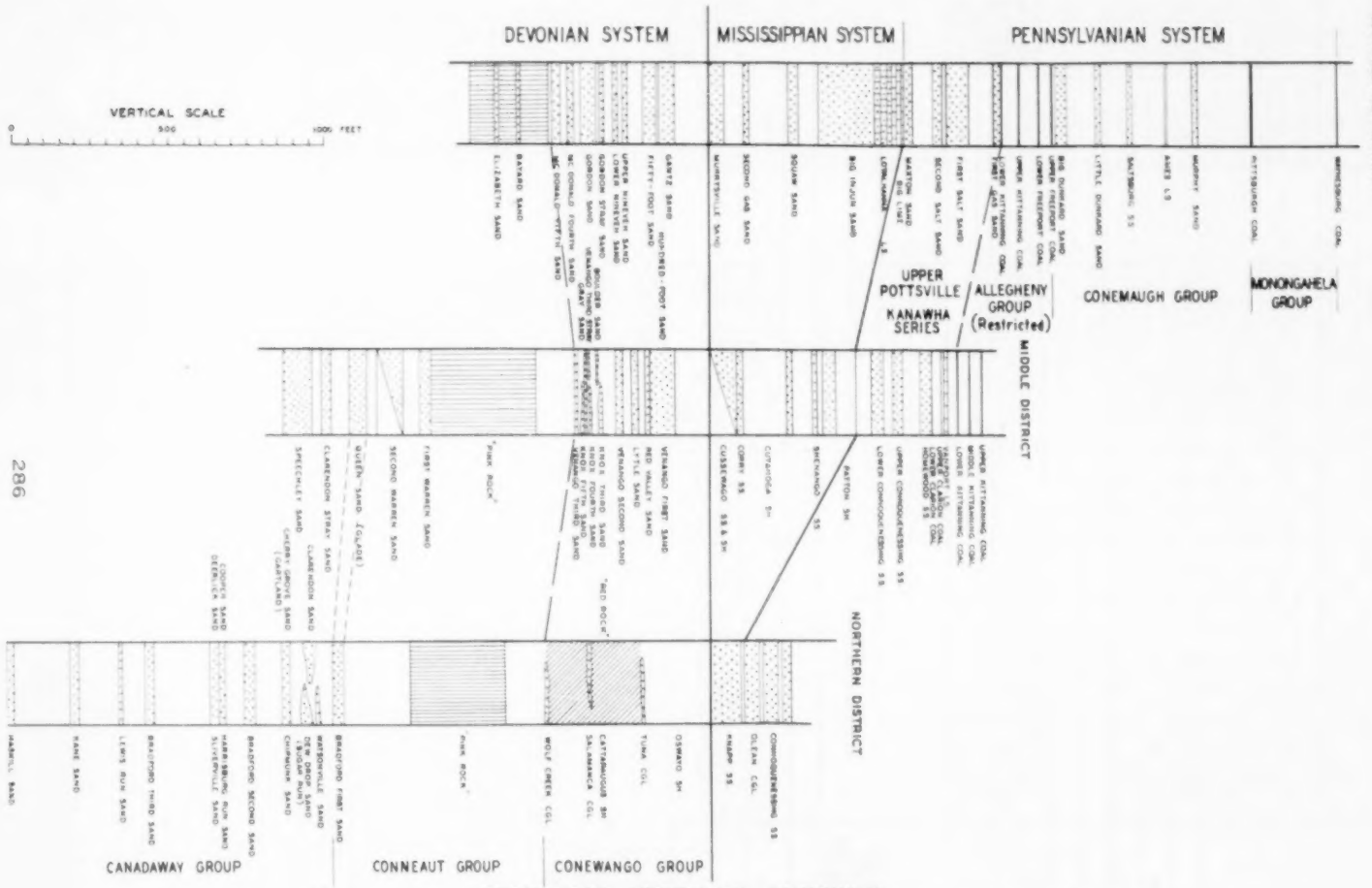
TABLE 3 DEEP WELLS COMPLETED IN WESTERN PENNSYLVANIA IN 1949

ELEVATIONS AND DEPTHS ARE IN FEET

COUNTY	Butler	Cameron	Clearfield	Crawford	Elk	North East	Fayette	Fayette	Potter
MAP NUMBER	1	2	3	4	5	6	7	8	9
NAME OF WELL	Mary Becker 1	Adeline Logue 1	Alice Irwin 1	Alfa Cozad	Danforth #1	Thos. Bertgess 1	W. H. Barton Estate B	John Dunn 1	Bert Simmons 1
OPERATOR	Hill Oil and Gas	H. K. Dougherty et al	F. C. Dreher	Appalachian Dev.	Humphrey Brick and Tile	H. M. Weaver W. R. Horger	Manufacturers Light and Heat	Orville Eberly et al	United Natural Gas
TOWNSHIP	Cherry	Grove	Bell	Beaver	Spring Creek	Venango	Georges	Georges	Hector
LATITUDE	69 mi. N 41°05'	1.61 mi. S 41°30'	2.46 mi. S 41°00'	1.60 mi. S 41°50'	1.23 mi. S 41°30'	2.18 mi. N 42°00'	.74 mi. N 39°45'	.25 mi. S 39°45'	2.69 mi. N 41°55'
LONGITUDE	1.70 mi. E 80°00'	1.61 mi. E 78°05'	.29 mi. N 78°45'	2.13 mi. E 80°30'	.45 mi. W 78°50'	.48 mi. W 79°50'	1.17 mi. E 79°45'	.98 mi. E 79°45'	1.85 mi. W 77°35'
DATE COMPLETED	7-22-49	11-2-49	2-49	5-26-49	5-49	4-1-49	2-20-49	7-22-49	4-23-49
ELEVATION	1098	1006	1964	1021	1457	1338	2588	2415	2027
BEREA CORRY									
MURRYSVILLE									
TULLY	4480	9100	6085 6865	1919	5410 5502	2025	6535 6610		4780 4835
ONONDAGA	4638 4817	5378 5389	7424 7431	2142 2388	5908 5967	2445	7102 7303 Top chert 7145	Top chert 7097	Not found
ORISKANY	4817 4855	5389 Flow gas at 5400 est. 8M/ after shot	7301 7339 Dry, 2 feet of sandstone at top	2388 2394 Flow gas at rate of 1 MM/ after shot	Sandstone absent	No sandstone	7303	7249 7350	Not found
SALINA							Salt 3220 3384 3421 3455 3706 3748 Lime 3455 3706		
LOCKPORT				Rock 1.26 at 1.2MM 1.04 after 1.251					
ALBION RED MEDINA (GRIMSBY)				Shale 1.45 1.49 Grimsby 1.490 1.512					
ALBION WHITE MEDINA (WHIRLPOOL)				1.614 1.625					
QUEENSTON				1.625					
TOTAL DEPTH	4889	5106	8049	1.8MM	6006	2.2MM	10,302	7386	6001
DEEPEST FORMATION TESTED	Orriskany	Orriskany	Oriskany	4.180MM	Orriskany	Orriskany	Salina	Oriskany	?
RESULT	Dry	90 MCF Gas Flow Check after shot RP 1300 lbs	Dry Numerous gas bearing sands 6.4 MCF Gas Flow Check after shot RP 1025 lbs. Salt water below	Shale at 2.1MM 100 MCF Gas Check after shoot RP 850 lbs 30 MCF gas Check	Gas bearing at 1.8MM 1.9MM 4.0M 4.05 No sandstone at Onoko Horizon	Dry	8 gas pockets 1.5MM to 1.8MM 214 MCF Gas Flow Check after shooting RP 425 lbs after shooting	2.5 MCF Gas Flow Check after shooting RP 1.9MM psi	Dry
COUNTY	Potter	Potter	Potter	Potter	Potter	Potter	Potter	Potter	Potter
MAP NUMBER	10	11	12	13	14	15	16	17	18
NAME OF WELL	Willis Harrington 1	Jane E. Miller Estate 1	Kathryn M. Page 1	Potter County Commissioners 1	Potter County Commissioners 2	H. D. Hotchkiss 1	State of Penna. 10	State of Penna. 11	State of Penna. 12
OPERATOR	H. K. Dougherty et al	G. L. Cabot Inc.	G. L. Cabot Inc.	R. L. Christman et al	R. L. Christman et al	G. L. Cabot Inc.	G. L. Cabot Inc.	G. L. Cabot Inc.	G. L. Cabot Inc.
TOWNSHIP	Summit	Wharton	Wharton	Wharton	Wharton	Wharton	Wharton	Wharton	Wharton
LATITUDE	1.85 mi. S 41°40'	.30 mi. N 41°30'	.10 mi. S 41°30'	.34 mi. N 41°30'	.05 mi. N 41°30'	1.12 mi. N 41°30'	.91 mi. N 41°30'	.11 mi. S 41°30'	1.53 mi. N 41°30'
LONGITUDE	2.07 mi. E 78°10'	.20 mi. W 78°00'	.81 mi. W 78°00'	.46 mi. W 78°00'	.49 mi. W 78°00'	.38 mi. W 78°00'	1.15 mi. E 78°00'	.36 mi. W 78°00'	.94 mi. E 78°00'
DATE COMPLETED	8-23-49	5-24-49	7-10-49	2-20-49	8-9-49	6-28-49	2-10-49	4-29-49	2-2-49
ELEVATION	1450	1196	1889	1266	1395	1345	2064	1920	1394
BEREA CORRY									
MURRYSVILLE									
TULLY		5807 5868	5344 5416	5210 5281	5803	5056 5127	6530 6654	5430 5535	5546 5622
ONONDAGA	5870	6101 6109	6046 6066	5960 6032	6933	5931 5961	6277 6286	6022 6041	6235 6250
ORISKANY	Sandstone absent	6106	6066	6032	6954	5961	6286	6041	6250
SALINA									
LOCKPORT									
ALBION RED MEDINA (GRIMSBY)									
ALBION WHITE MEDINA (WHIRLPOOL)									
QUEENSTON									
TOTAL DEPTH	3770	6148	6086	5965	5814	1983	6302	6076	6287
DEEPEST FORMATION TESTED	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT	No sandstone at Oriskany Horizon Show of gas 370 lbs	140 MCF Gas Flow Check after shot RP 2250 lbs	1.2 MM Gas Flow Check after shot RP 2000 lbs	400 MCF Gas Flow Check after shot	400 MCF Gas Flow Check after shot RP 2000 lbs	1.2 MM Gas Flow Check after shot RP 2150 lbs	1.1 MM Gas Flow Check after shot RP 1.9MM lbs	600 MCF Gas Flow Check after shot RP 1.8MM lbs	1.2 MM Gas Flow Check after shot

TABLE 3 - CONTINUED

COUNTY	Potter	Potter	Potter	Potter	Somerset	Tioga	Tioga	Tioga	Westmoreland
MAP NUMBER	19	20	21	22	23	24	25	26	27
NAME OF WELL	State of Penna 13	State of Penna 14	State of Penna 15	State of Penna 16	R.F. Grove 1	Arthur Brock 1	Chas. Ball 1	New York State Natural Gas 1	William Piper 1
OPERATOR	G.L. Cabot Inc.	G.L. Cabot Inc.	G.L. Cabot Inc.	G.L. Cabot Inc.	Peoples Natural Gas	W.E. Sneer et al	W.E. Sneer et al	New York State Natural Gas	Peoples Natural Gas
TOWNSHIP	Wharton	Wharton	Wharton	Wharton	Shaer	Charleston	Covington	Lawrence	Unity
LATITUDE	.35 mi. N 41°30'	.51 mi. S 41°30'	.10 mi. S 41°30'	1.53 mi. N 41°30'	.05 mi. N 40°05'	1.57 mi. S 41°45'	.27 mi. N 41°45'	2.88 mi. S 42°00'	.70 mi. S 40°15'
LONGITUDE	1.04 mi. E 78°00'	.59 mi. W 78°00'	.46 mi. E 78°00'	1.89 mi. E 78°00'	.55 mi. E 78°35'	.90 mi. W 77°15'	1.92 mi. E 77°05'	1.85 mi. E 77°10'	1.27 mi. W 79°20'
DATE COMPLETED	6-15-49	9-29-49	10-4-49	10-26-49	2-24-49	3-15-49	7-27-49	8-10-49	8-17-49
ELEVATION	2045	1972	1914	1604	2343	1764	1375	1460	2061
BEREA - CORRY									
MURRYSVILLE									
TULLY	5456 - 5530	5406 - 5487	5328 - 5402	5159 - 5228	7860 - 7865	4535 - 4620	4195 - 4310	2763 - 2830	7475 - 7550
ONONDAGA	6142 - 6156	6102 - 6123	6016 - 6028	5853 - 5862	8950 - 9124 No Chert 8965	5535 -	5347	3335 - 3754	8128 - 8307 No Chert 8134 134 MCF 8161 - 8178
ORISKANY	6156	6123	6028	5862	9124 - 9257 Shows of Oil at 9227	5569 - 5610	5403 - 5440	3754 - 3790	8301 - 8360 Shows of gas 8308 - 8360
SALINA									
LOCKPORT									
ALBION RED MEDINA (GRIMSBY)									
ALBION WHITE MEDINA (WHIRLPOOL)									
QUEENSTON									
TOTAL DEPTH	6174	6157	6051	5886	9369	5760	5573	3800	8352
DEEPEST FORMATION TESTED	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT	4414 MCF Gas from Oriskany RP 2125 psi	810 MCF Gas from Oriskany RP 2000 psi	2200 MCF Gas from Oriskany RP 1850 psi	1446 MCF Gas from Oriskany HP 1080 psi	Dry in Onondaga and Oriskany Show of Oil at 9225 Show of gas at 9303	Dry in Oriskany No salt water	Dry in Oriskany	Drilled for gas storage	145 MCF Gas from Onondaga after acidizing RP 1875 psi Shows of gas 8469



COLUMNAR SECTIONS SHOWING

FIG. 2 STRATIGRAPHIC POSITIONS OF OIL AND GAS SANDS OF WESTERN PENNSYLVANIA

CHAS. P. FETTKE 1948

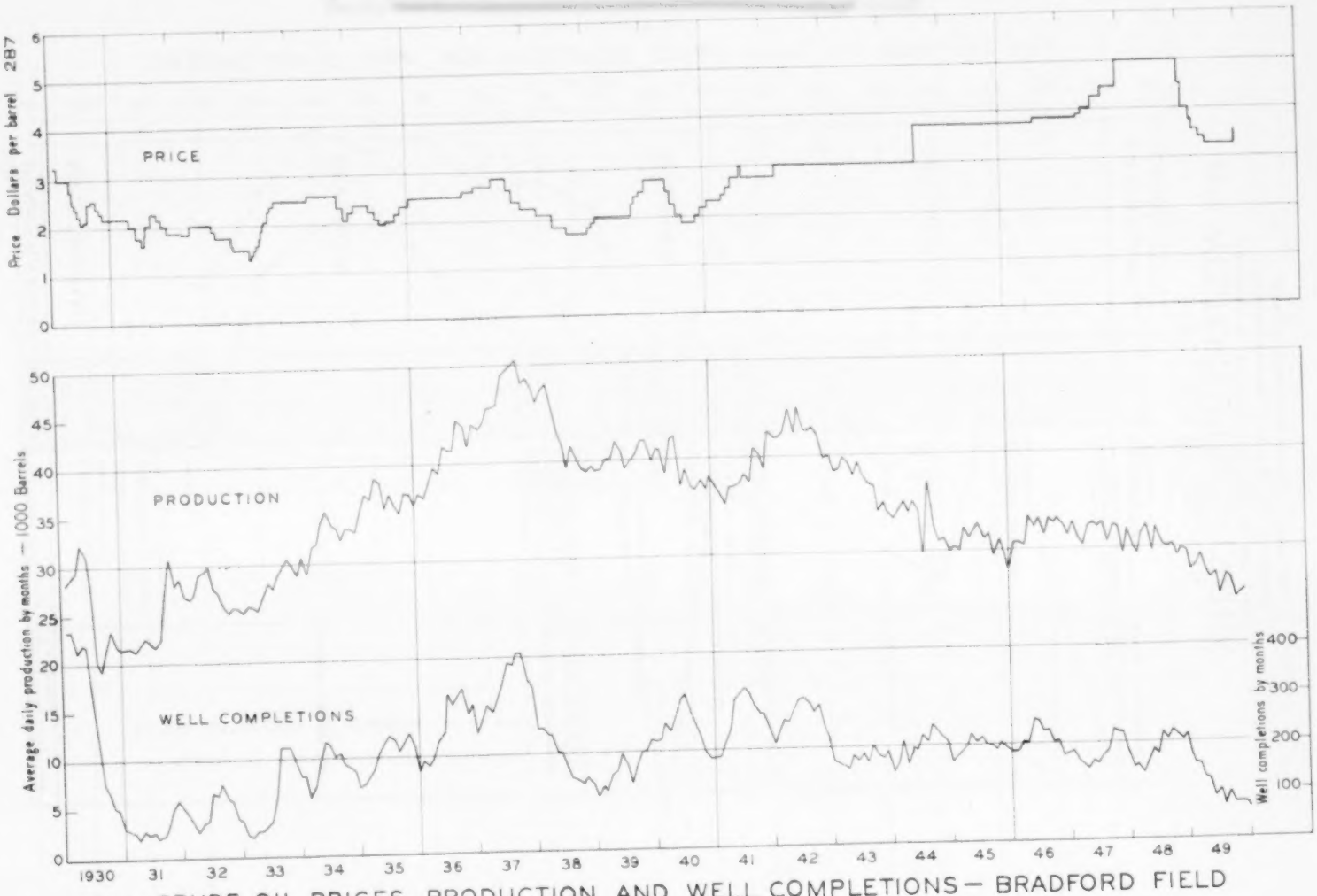
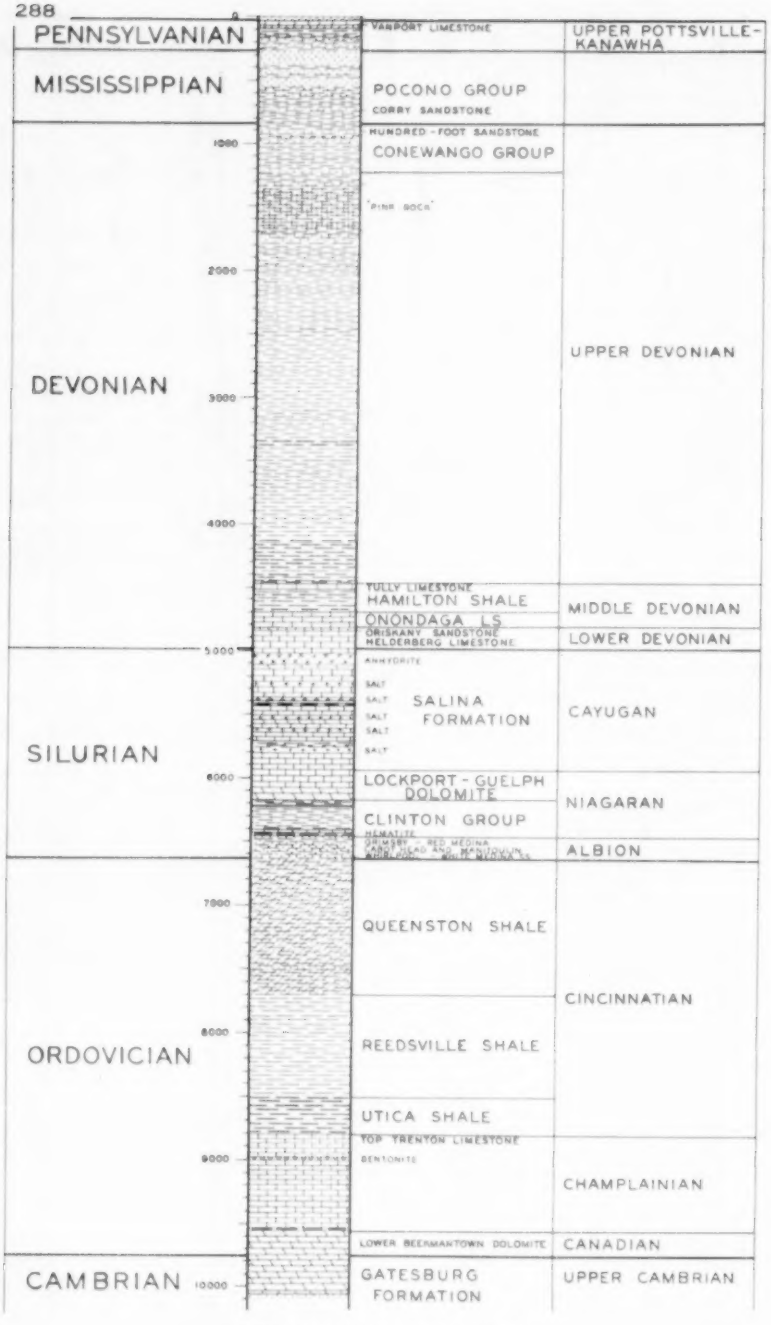


FIG. 3 CRUDE OIL PRICES, PRODUCTION AND WELL COMPLETIONS— BRADFORD FIELD



COLUMNAR SECTION

FIG. 1 **WESTERN PENNSYLVANIA**

OBTAINED IN JESSIE G HOCKENBERRY WELL NO 1
MANUFACTURERS LIGHT & HEAT COMPANY
MERCER TOWNSHIP, BUTLER COUNTY, PA

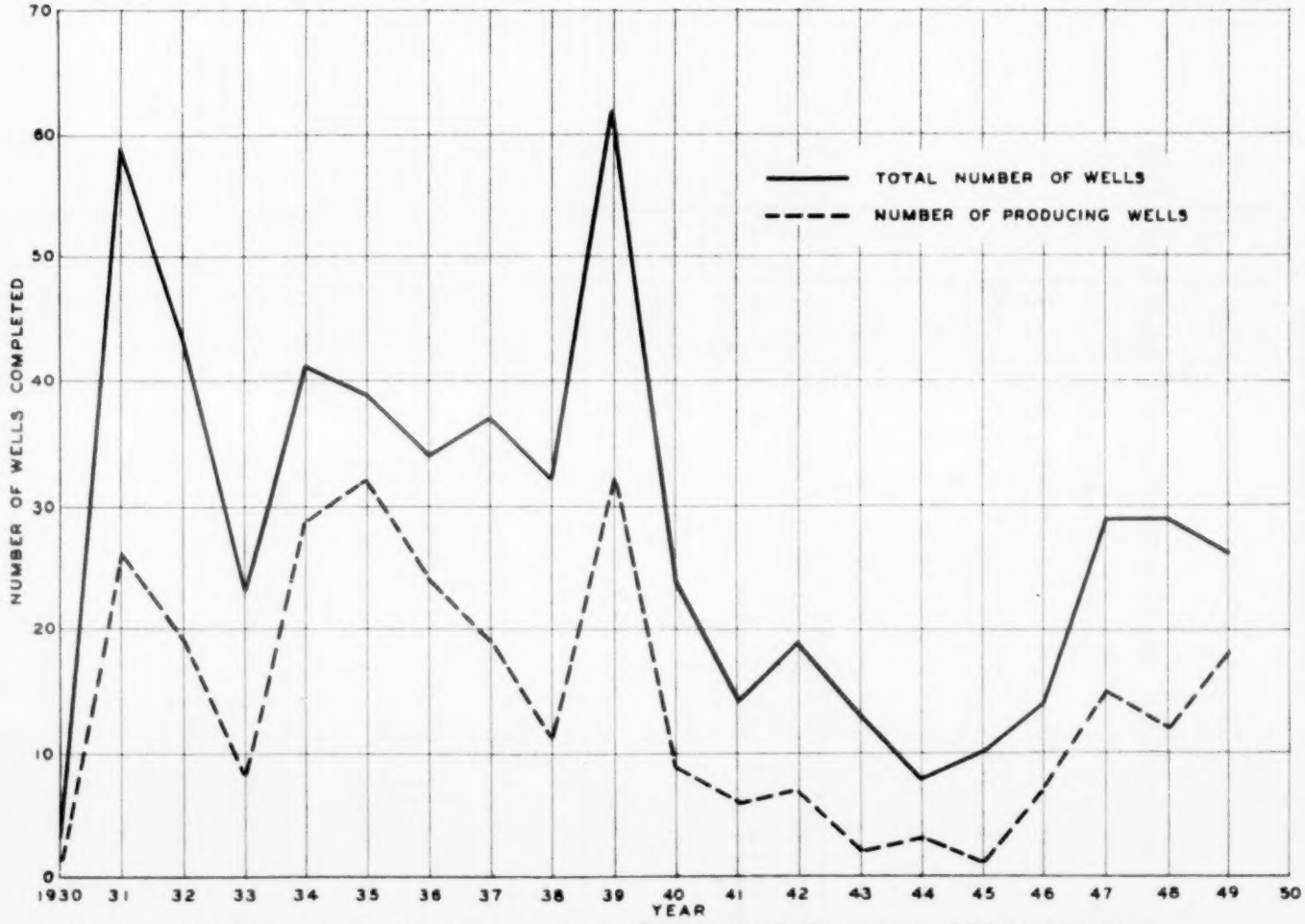
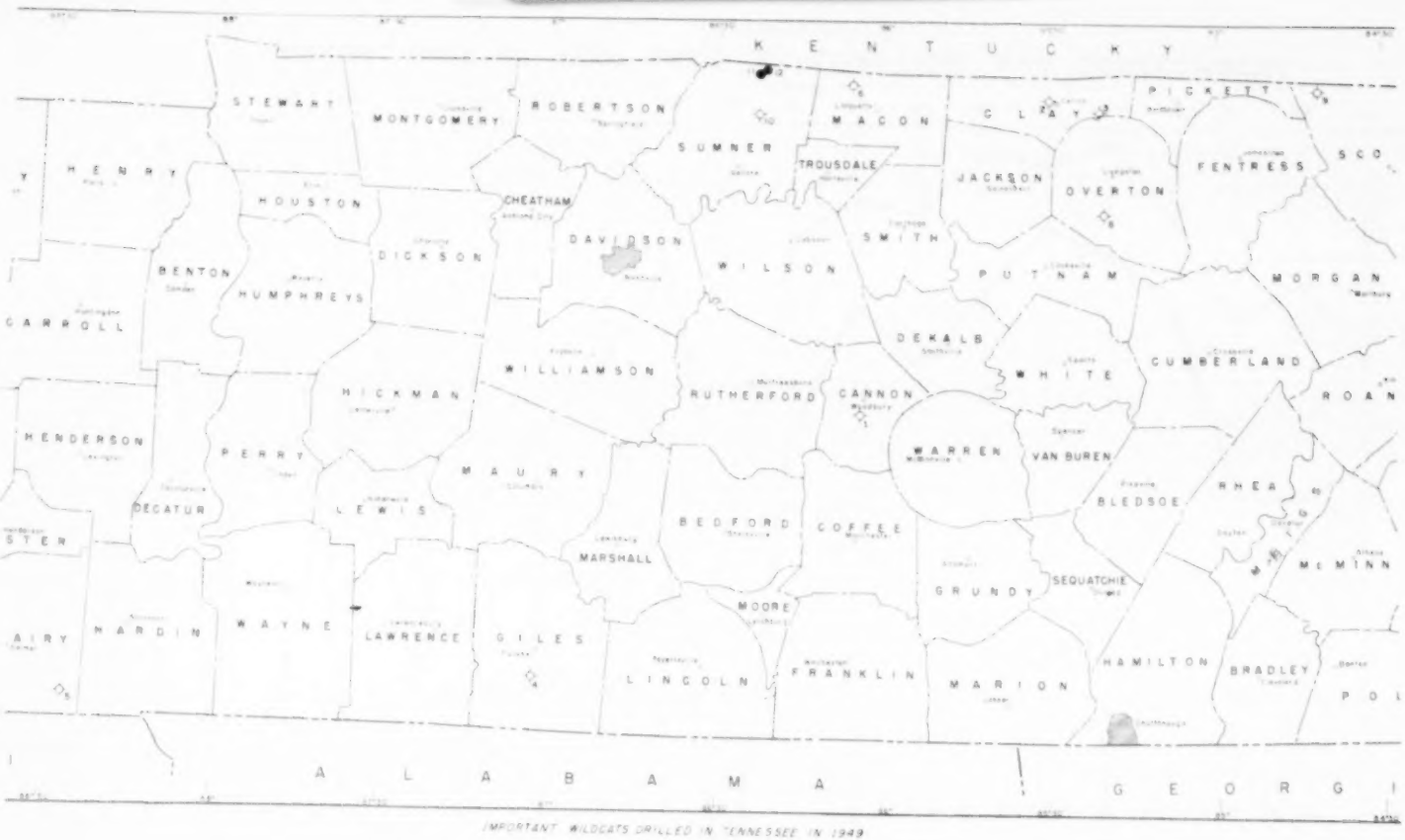


FIG. 5 ANNUAL RATE OF DEEP SAND EXPLORATION AND DEVELOPMENT IN PENNSYLVANIA



IMPORTANT WILDCATS DRILLED IN TENNESSEE IN 1949

LEGEND

Oil And Gas Developments In Tennessee During 1949

By H. C. MILHOUS *

During the year 1949 there were 47 test wells drilled in Tennessee with a total footage in excess of 40,000 ft. Eight successful wells were completed. Two of these were wildcats and are producing from the Silurian in Sumner County; one was a new pool extension now producing from the Upper Stones River in Clay County, and the other five, also classed as "new pool extension" wells, are producing from the Chester in Morgan County.

First in importance among the wildcats was the Stephens Petroleum Company's deep test in McNairy County, the Petrie No. 1, which was plugged in July of last year. Information has not yet been released on this test but its total depth was reliably reported to be 5,280 ft, making it second in depth only to the California Company's 5,750 ft test completed in 1947, the deepest well ever drilled in Tennessee.

In Cannon County the Magnolia Petroleum Company, No. 1 Gaither was abandoned at 1,944 ft after encountering several water zones in the Knox dolomite. The top of the Knox in this hole was at 714 ft.

A Sun Oil Company farm-out in Macon County, the Read & Sharpe, No. 1 Humphrey, was dry and abandoned at 1,677 ft and in East Tennessee, the Freeman-Sport, No. 1 Roberts in Meigs County, was dry and abandoned at 1,804 ft.

With the exception of the above tests only 6 wells entered the Knox dolomite and these were discontinued after penetrating less than 400 ft of the Knox.

The unexpected lull in drilling activity in Tennessee in 1949, as compared with 1948, showed indications of breaking as the year closed with wells drilling in all three major provinces of the State. Leasing was also going on in widely scattered localities and the new year opened with more proposed tests reported than were anticipated earlier.

PRODUCTION

OIL

Total oil production for 1949 was 18,000 bbl or slightly less than for the preceding year. Production was from six counties located in the north and northeast-central part of the State, and these are listed in the table below.

COUNTY	1949 PRODUCTION Bbl	PRODUCING ZONE
Clay	2,220	Stones River U
Fentress	1,292	Knox
Morgan & Scott	12,094	Chester
Pickett	1,894	Knox & Stones R.
Sumner	500 E	Silurian
TOTAL:	18,000	

GAS

All commercial gas was produced from Morgan and Scott Counties combined, and Fentress County. The former counties produced 125.5 Mcf and the latter 11.5 Mcf, making a total of 137 Mcf for the year. The drop from 157.5 Mcf in 1948 is explained by the mild winter seasons in 1949.

The writer wishes to express appreciation for the assistance of Mr. H. B. Burwell, State Geologist of Tennessee, and for the cooperation of the drillers, operators and refiners who furnished valuable information.

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MANUSCRIPT RECEIVED IN THE OFFICE OF THE INSTITUTE, OCTOBER, 1950.

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY, FARM WELL NUMBER	OPERATOR	GENERAL LOCATION	T. D.	SURFACE FORMATION	DEEPEST ZONE TESTED	RESULT
	CANNON						
1	Gaither 1	Magnolia Pet. Co.	SW-15-9S 42 E	1,944	Trenton L	Knox U	D & A
	CLAY						
2	Cook 1	Moland Oil Co.	NE-1-A 48 E	1,516	Trenton L	Knox U	D & A
3	Collins 1	Woodson Diamond	NE-19-A 50 E	2,058	Mis L	Knox U	D & A
	GILES						
4	Manley 1	H. T. Giles	SW-8-17S 30 E	1,003	Stones R. U	Knox U	D & A
	McNAIRY						
5	Petrie 1	Stephens Pet. Co.	SE-9-18S 13 E	5,280	Cret. L	Knox L	D & A
	MACON						
6	Humphrey 1	Read & Sharpe	SW-20-B 41 E	1,677	Mis L	Knox U	D & A
	MEIGS						
7	Roberts 1	Freeman-Sport	NW-15-13S 57 E	1,804	Ord L	Knox	D & A
	OVERTON						
8	Fee 1	J. M. Capps	NE-11-3S 50 E	1,865	Mis L	Knox U	D & A
	SCOTT						
9	Copeland & Hurt 1	Williams, Duncan et al	SW-22-B 58 E	785	Mis U	Mis L	D & A
	SUMNER						
10	Perdue 1	Carl Abbott	NE-18-B 38 E	415	Mis L	Ord U	D & A
11	Scott 1	W. B. Dye	SE-8-B 38 E	500	Mis L	Silurian	Oil- Disc. Nubia Field
12	Neely 3	Leeson & Miller	SW-9-B 39 E	240	Mis L	Silurian	Oil- Disc. Sugar Grove Field

Oil And Gas Developments In West Texas During 1949

By LEONARD H. THAWLEY,* Member AIME

GENERAL DEVELOPMENTS

A total of 3,261 exploratory and development wells were completed in West Texas during 1949 to surpass the 1948 record of 3,251 wells. The completions consisted of 2,788 oil wells, 24 gas wells, and 449 dry holes. The average total depth of all completions is 5,025 ft, which also exceeds the 1948 record of 4,745 ft.

EXPLORATORY WELLS

Exploratory wells drilled totaled 343, of which 63 were productive of oil; 6 were gas producers; and 274, or 80 per cent, were dry holes.

The Texas Co.'s Scharbauer No. 1, discovery well of Warfield pool in the west central part of Midland County, established a new record depth for oil production from the West Texas area, being completed in Ellenburger formation through casing perforations from 13,049 ft. to 13,130 ft.

The Scurry County reef (Canyon limestone) activity was further expanded by two major discoveries, Diamond M and Sharon Ridge, to make it predominant in both exploratory and development wells.

The Pegasus Field, located on the line between Upton and Midland counties, and the Warfield pool, are two 1949 discoveries which prove the possibilities for further exploration in the Midland Basin.

A significant development is the discovery in several counties of a new pay, Spraberry sand, which is a sand facies probably in the Wichita Albany series of Permian age. First developed in South Gail pool, Borden County, in December, 1948, it is the producing formation in the following pools discovered during 1949:-

Spraberry Deep, Dawson County
Tex Harvey, Midland County
North Gail, Borden County

There were 11 oil discoveries in Runnels County from the Cisco, Canyon, and Strawn series of Pennsylvanian age, the Strawn series containing seven of the discoveries.

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DEVELOPMENT WELLS

Development well completions totaled 2,918, of which 2,725 were oil wells; 18 were gas wells; and 175 were dry holes. The most active development occurred in the following fields:-

Diamond M, Kelley, Sharon Ridge, and North Snyder, Scurry County, all in Canyon limestone formation - 305 oil wells.

Levelland, Cochran, and Hockley counties - 300 oil wells.

Slaughter, Cochran, Hockley, and Terry counties - 117 oil wells.

Toborg, Pecos County - 116 oil wells.

OIL PRODUCTION

Total oil production was 228,888,971 bbl. from a total of 26,040 wells, 10,735 (or 41 per cent) of which were flowing wells. This production is 45,353,611 bbl, or 16.5 per cent, less than last year's total production due to decreased demand in this area. Cumulative oil production for the area is 2,736,890,425 bbl.

TECHNICAL DEVELOPMENTS

The only development noted is an additional aid to electric logging, known as "MicroLogging." It is an apparatus with small measuring devices which maintain contact with the wall of the well bore. It is claimed that the apparatus records a detailed analysis of the sequence of permeable and impervious strata.

ACKNOWLEDGMENTS

The cooperation of various individuals and companies in furnishing data is gratefully acknowledged. Particular acknowledgment is due V.E. Cottingham, chairman of North Basin Pools Engineering Committee, for contributing the oil production, number of wells and average total depths by fields. Phillips Petroleum Co. furnished all data on dry gas fields.

LINE NUMBER	FIELD (County)[3]	PRODUCING FORMATION NAME AND AGE[4]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[5] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT TO END OF 1949	MILLION CU FT DURING 1949		TO END OF 1949	DURING 1949
1	Abell (Permian), *Pecos*	Clearfork,Wichita,Per.	1941	735	833,051	72,446						
2	Abell (Upper Permian), *Pecos*	San Andres, Per	1947	40	3,415	941						
3	Abell (Silurian,Montoya),*Pecos*	Fusselman, Sil	1948	640	166,176	158,177						
4	Abell, *Pecos*	Simpson & Ellenburger, Ord	1946	2,700	6,303,502	502,167						
5	McKee Sand	Simpson, Ord	1940				640	733.5	380.4			
6	Simpson Polomite	Simpson, Ord	1943				80	544.9	339.4			
7	Waddell Sand	Simpson, Ord	1941				80	213.1	34.0			
8	Ellenburger	Ellenburger, Ord	1941									
9	Abell Northwest, *Pecos*	McKee, Ord	1949	200	107,621	107,621						
10	Abell (Upper McKee), *Pecos*	Simpson, Ord	1949	40	533	533						
11	Abell-Waddell, *Crane*	Waddell, Ord	1946				160	205.5	24.2			
12	Adair, *Gaines & Terry*	San Andres, Per	1947	4,400	1,930,880	882,094						
13	Addis Deep, *Ector*	Cisco, Pen	1947	40	15,304	3,746						
14	Addis (Strawn), *Ector*	Strawn, Pen	1948	80	45,919	34,841						
15	Aldridge, *Runnels*	Strawn, Pen	1949	120	7,632	7,632						
16	Alex, *Terry*	San Andres, Per	1945	200	94,923	17,525						
17	Andector (McKee), *Ector*	Simpson, Ord	1948	80	40,183	35,112						
18	Andector (Waddell), *Ector*	Simpson, Ord	1948	120	78,603	47,376						
19	Andector (Ellenburger), *Ector*	Ellenburger, Ord	1946	3,560	7,927,282	3,837,668						
20	Andector-San Andres, *Ector*	San Andres, Per	1947				160	265.6	89.7			
21	Anton-Irish, *Lamb & Hale*	Clearfork, Per	1944	5,360	5,804,234	2,519,468						
22	Apco-Warnes, *Pecos*	Ellenburger, Ord	1939	1,840	4,596,115	465,067						
23	Arick(Wolfcamp) *Hale & Floyd*	Wolfcamp, Per	1948	80	52,164	47,430						
24	Arick, *Hale & Floyd*	Pen	1948	160	158,343	107,375						
25	Arledge, *Coke*	Marble Falls, Pen	1948	80	31,575	5,948						
26	Ballinger, *Runnels*	Strawn, Pen	1948	120	51,245	20,669						
27	Barnhart, *Reagan*	Ellenburger, Ord	1941	2,840	9,025,303	1,341,831						
28	Bateman Ranch, *King*	Cisco & Canyon, Pen	1943	2,240	2,146,580	471,613						
29	Beach (Strawn), *Schleicher*	Strawn, Pen	1949	40	3,932	3,932						
30	Beckh, *Runnels*	Canyon & Strawn, Pen	1938	480	271,496	32,124						
31	Beckh(Duncworth Lime), *Runnels*	Strawn, Pen	1949	80	21,449	21,449						
32	Bedford (Devonian), *Andrews*	Dev	1945	560	1,272,219	329,700						
33	Bedford (Ellenburger), *Andrews*	Ellenburger, Ord	1945	560	1,594,312	471,630						
34	Benedum(Lower Leonard),*Reagan*	Leonard, Per	1949	80	2,691	2,691						
35	Benedum(Pennsylvanian), *Reagan & Upton*	Pen	1948	400	184,564	156,324						
36	Benedum (Silurian), *Upton*	Fusselman, Sil	1948	1,600	198,191	179,508						
37	Benedum (Ellenburger), *Upton*	Ellenburger, Ord	1947	2,240	1,102,245	824,445						
38	Betty, *Crockett*	San Andres, Per	1949	40	2,116	2,116						
39	Big Lake, *Reagan*				107,422,784	1,042,632						
40	2,800 ft. pay	Queen, Per	1923									
41	3,000 ft. pay	San Andres, Per	1923		76,373,689	751,210						
42	4,300 ft. pay	Clearfork, Per	1923									
43	Ben & Ord	Per & Ellenburger, Ord	1928		31,049,095	291,422	480	20,191.1	286.7			
44	Blackwell, *Coke*	Wolfcamp, Per	1942	40	12,700	1,188						
45	Block 12, *Andrews*	Clearfork, Per	1946	1,520	811,154	202,553						
46	Block 12 (Devonian), *Andrews*	Dev	1946	40	7,565	2,910						
47	Block 12 - Yates, *Andrews*	Yates, Per	1946				100	124.5	75.2			
48	Block 31 (Devonian), *Crane*	Dev	1945	4,400	4,299,905	1,359,810						
49	Block 31 (McKee), *Crane*	Simpson, Ord	1948	160	55,659	53,611						
50	Block 31 (Connell), *Crane*	Simpson, Ord	1948	80	94,540	84,635						
51	Block 31 (Ellenburger), *Crane*	Ellenburger, Ord	1945	1,120	1,640,147	361,860						
52	Block 47 (Shallow), *Crockett*	San Andres, Per	1947	240	18,509	7,297						
53	Bolt, *Kimble*		1949	40	4,585	590						
54	Borden, *Borden*	Sil - Dev	1949	80	32,833	32,833						
55	Brahaney, *Yoakum*	San Andres, Per	1945	80	25,759	6,448						
56	Brente, *Coke*	Canyon, Pen	1948	320	199,336	189,404						
57	Brookshier, *Runnels*	Strawn, Pen	1949				80	28.9	28.9			
58	Brown, *Gaines*	Glorietta, Per	1948	160	39,112	23,814						
59	Buck, *Howard*	Canyon, Pen	1947				40	-0-	-0-			
60	Buenos, *Terry*	San Andres, Per	1949	20	4,140	4,140						
61	Bird, *Hard*	Yates, Per	1942	140	207,936	13,857						
62	Cardinal, *Pecos*	Yates, Per	1929				160	1,034.1	119.0			
63	Carter, *Glasscock*	San Andres, Per	1936	20	41,868	2,829						
64	C-Bar, *Crane*	San Andres, Per	1949	60	13,595	13,595						
65	C-Bar (Silurian), *Crane*	Fusselman, Sil	1948	80	55,345	20,025						
66	C-Bar (Connell), *Crane*	Simpson, Ord	1948	80	20,378	13,984						
67	Cedar Lake, *Gaines*	San Andres, Per	1930	3,840	5,920,204	1,005,905						
68	Cedar Lake - Yates, *Gaines*	Yates, Per	1946				80	51.4	25.0			
69	Chancellor, *Pecos*	Delaware Mtn, Per	1942	80	117,036	8,969						
70	Chapman, *Reeves*	Delaware Mtn, Per	1948	320	76,257	70,150						
71	Charles, *Pecos*	x	1949	20	2,816	2,816						
72	Childress, *Crockett*	Ellenburger, Ord	1947	160	7,890	0						
73	Clabberhill, *Andrews*	San Angelo, Per	1943	80	146,011	12,605						
74	Clara Couch, *Crockett*	Grayburg,San Andres,Per	1941	450	998,370	218,464	60	85.9	30.9			
75	Clara Couch (Wolfcamp),*Crockett*	Wolfcamp, Per	1947	80	136,942	33,987	320	1.5	1.5			
76	Clark (San Andres), *Sterling*	San Andres, Per	1949	120	7,918	7,918						
77	Cogdell, *Kent*	Canyon Reef, Pen	1949	40	1,680	1,680						
78	Coleman Ranch, *Mitchell*	Clearfork, Per	1946	480	526,049	179,757						

LINE NUMBER	NUMBER OF WELLS[6] COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	WELLS PRODUCING[6] DEC. 1949 OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	RESERVOIR PRESSURE LB PER SQ INCH INITIAL	RESERVOIR PRESSURE LB PER SQ INCH AVG./END 1949	SECONDARY RECOVERY[4]	CHARACTER OF OIL[5] GRAVITY A.P.I.	CHARACTER OF OIL[5] SULPHUR PER CENT	PRODUCING FORMATION CHARACTER[1]	POROSITY PER CENT[7]	DEPTH TO TOP OF PRODUCING ZONE FT.[8]	PROD. THICKNESS AVG. FT. - NET	STRUCTURE[9]	DEEPEST ZONE TESTED[8] TO END OF 1949 NAME	DEPTH OF HOLE, FT.
1	21	0	0	6	15					34.0	0.6	D	P	2,275 3,895	50		Pre-Cambrian	5,745
2	1	0	0	0	1					41.0	1.5	D	P	3,165	10		Pre-Cambrian	5,745
3	11	9	0	11	0					39.7	1.5	L	P-C	4,959	10		Pre-Cambrian	5,745
4	104	0	1	61	11					42.5	0.14			5,018			Ellenburger, Ord	6,483
5						R	2,550	x			x	S	P		17			
6						1	2,562	x			1.5	D	P-F		23			
7						1	2,755	x			x	S	P		11			
8							2,695	x			x	D	P-F		10			
9	5	5	0	5	0		2,385	2,385		42.0	x	x	x	5,471	6		Simpson, Ord	6,010
10	1	1	0	1	0					32.8	x	x	x	5,940	10		Simpson, Ord	5,940
11	1	0	0			1	x	1,750				S	x	5,700	x			
12	111	22	0	1	109		1,900	1,041		33.0	x	D	P	4,898	60		San Andres, Per	4,955
13	1	0	0	0	1					33.0	1.38	L	x	8,565	75		Ellenburger, Ord	13,620
14	2	1	0	2	0					39.0	x	x	x	9,220	20		Strawn, Pen	9,235
15	3	3	0	2	1					42.0	x	x	x	3,938	11		Strawn, Pen	4,073
16	5	1	0	2	3					32.0	x	D	P	5,160	45		San Andres, Per	5,243
17	2	1	0	2	0					43.0	0.13	S	x	7,715	75		Pre-Cambrian	8,562
18	3	1	0	3	0					44.0	0.14	S	6.95	7,872	35		Pre-Cambrian	8,562
19	89	18	0	87	2		3,300	3,047		44.0	0.2	D	F-P	8,532	55		Pre-Cambrian	8,562
20	1	0	0			1	1,450	x				D		4,230	x		San Andres, Per	4,230
21	134	18	0	0	134		2,021	864		32.0	x	D	10.0	6,052	325		Pre-Cambrian	11,730
22	46	1	1	26	20		2,250	1,794		42.0	0.3	D	P	4,719	100		Ellenburger, Ord	5,356
23	2	2	0	1	1					35.0	x	x	x	4,810	40		Pre-Cambrian	6,760
24	5	0	0	1	4					42.0	x	D	x	5,897	100		Pre-Cambrian	7,757
25	3	0	0	2	0	1				47.8	x	L	x	6,772	20		Pennsylvanian	6,820
26	3	1	0	2	1					46.5	x	L	x	4,112	25		Ellenburger, Ord	4,431
27	72	11	1	63	8		3,915	x		44.2	0.06	D	4.0	9,149	140		Ellenburger, Ord	9,394
28	56	12	0	6	50					33.1	x	x		3,700	x		Pre-Cambrian	6,388
													x	5,100	x			
														5,300	x			
29	1	1	0	0	1					39.2	x	x		5,800	10		Strawn, Pen	6,775
30	12	0	0	5	7					37.0	x	S	P	2,361 3,553	15		Strawn, Pen	4,040
31	2	2	0	2	0					46.0	x	x	x	3,724	20		Strawn, Pen	4,040
32	7	0	0	7	0		3,629	x		43.0	0.7	C-H	P	9,234	373		Ellenburger, Ord	11,670
33	7	0	0	6	1		4,744	x		43.0	0.1	D	F-P	11,362	652		Ellenburger, Ord	11,670
34	1	1	0	0	1					38.0	x		x	7,430	30		Ellenburger, Ord	12,354
35	5	4	0	5	0		5,112	4,700		58.7	x	D	x	10,606	80		Ellenburger, Ord	12,367
36	20	19	0	20	0		5,013	4,936		58.7	x	x	1.5	11,000	80		Ellenburger, Ord	12,036
37	28	21	0	28	0		5,227	4,819		56.0	x	x	x	11,500	150		Ellenburger, Ord	12,036
38	1	1	0	0	1					25.6	x	x	x	1,405	6		San Andres, Per	1,405
39																		
40												S	P	2,440				
41				0	168					38.0	x	D	P	2,962	150		Ellenburger, Ord	9,562
42												D	P	4,373				
43	30	0	0	5	11	3				44.0	x	D	P	8,634	175			
44	1	0	0	0	1					41.5	x	L	P	3,828	7		Canyon, Per	3,828
45	38	7	0	7	29					32.5	x	L-D	P	7,248	80		Ellenburger, Ord	10,760
46	1	0	0	0	1					39.0	x	L-Cl	P	8,540	95		Ellenburger, Ord	10,760
47	1	0	0			1	1,385	x						2,800	x			
48	55	17	0	48	7		4,145	x		43.0	0.15	C-H-L	15.0	8,867	175		Pre-Cambrian	11,645
49	2	0	0	1	1		3,920	x		44.5	x	S	x	9,700	40		Pre-Cambrian	11,645
50	2	0	0	2	0		4,100	x		43.8	x	x	x	10,182	25		Pre-Cambrian	11,645
51	14	3	0	12	1		4,730	x		46.0	0.12	D	F-P	10,485	250		Pre-Cambrian	11,645
52	7	0	0	0	7					33.0	x	D	P	2,175	65		Ellenburger, Ord	10,232
53	2	0	0	1	1					27.0	x	S	P	1,412	15		Pre-Cambrian	4,171
54	1	1	0	1	0					42.8	x	x	x	9,933	125		Ellenburger, Ord	10,035
55	2	0	0	0	2					32.0	x	D	P	5,301	29		San Andres, Per	5,301
56	19	18	0	9	10					44.0	x	x	x	4,400	40		Pre-Cambrian	5,802
57	1	1	0			1	1,309	x				L	x	3,800	x		Strawn, Pen	3,800
58	4	0	0	0	4					35.0	x	S-D	x	6,115	60		Wichita, Per	7,850
59	1	0	0			1	415	x				S	x	900	x			
60	1	1	0	0	1					36.3	x	x	x	3,581	18		San Andres, Per	3,581
61	7	0	0	3	4		1,435	x		30.0	1.6	S-D	P	2,642	45		Yates, Per	3,200
62	2	0	0			2	x	600				S	x	1,600	x		Yates, Per	1,600
63	1	0	0	0	1					30.0	0.67	D	P	2,669	30		San Andres, Per	2,707
64	3	3	0	2	1					35.2	x	x	x	3,494	29		Ellenburger, Ord	9,940
65	1	0	0	0	1		3,250	x		35.9	x	x	x	8,343	50		Ellenburger, Ord	9,940
66	1	0	0	1	0					42.8	x	x	x	9,559	40		Ellenburger, Ord	9,940
67	86	16	0	2	84		1,900	x	G	33.0	2.1	D	16.0	4,796	160		Mississippian	11,954
68	1	0	0			1	1,950	x				S	x	2,950	x			
69	2	0	0	0	2		1,915	x		36.0	0.22	S	P	5,173	30		Delaware Mtn, Per	6,000
70	16	14	0	6	10					42.0	x	S	x	2,926	6		Delaware Mtn, Per	2,926
71	1	1	0	0	1					36.0	x	x		1,380	13		x	1,380
72				Wells plugged and field abandoned - 10/6/48														
73	2	0	0	0	2					33.0	x	D-S	P	5,460	30		Permian	7,500
74	48	5	0	0	44	3				26.0	x	D	P	1,568 2,079	20		Ellenburger, Ord	8,264
75	6	0	2	2	0	2				39.0	x	L	P	5,717	15		Ellenburger, Ord	8,264
76	6	6	0	0	6					36.0	x	x	x	1,039	8		Clearfork, Per	1,400
77	1	1	0	1	0					41.7	x	x	x	6,852	61		Canyon, Pen	6,857
78	49	4	0	0	48					25.0	x	L	P	2,825	60		Clearfork, Per	2,770

TABLE 1 - CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR WEST TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
79	Cortiva Lake, *Crane*	Dev	1949	40	9,102	9,102						
80	Cowden, Crane, *Crane*	Grayburg-San Andres,Per	1926	2,860	6,265,846	94,887						
81	Cowden, North, *Ector*	Grayburg, Per	1930	27,680	78,969,341	5,379,302	500	3,543.5	100.0			
82	Cowden, North Deep, *Ector*	San Andres, Per	1939	2,480	2,946,103	706,868						
83	Cowden, South, *Ector*	Grayburg-San Andres,Per	1930	12,520	12,816,845	2,617,838						
84	Cox, *Crockett*	Queen, Per	1948	80	14,703	4,774						
85	Crane, South, *Crane*	Grayburg, Per	1948	40	2,242	319						
86	Cravens, *Lubbock*	Clearfork, Per	1945	80	17,933	6,304						
87	Crockett, *Crockett*	Grayburg, Per	1938	2,680	1,175,394	173,551	160	106.6	33.0			
88	Cronnett 3200, *Crane*	San Angelo, Per	1944	80	28,879	5,254						
89	Cronnett, *Crane*	Dev	1944	800	805,340	144,905						
90	Deep Rock, *Andrews*	San Andres, Per	1933	1,040	1,128,493	78,266						
91	Deep Rock(Glorietta), *Andrews*	Glorietta, Per	1948	40	10,465	9,574						
92	Dermott, *Scurry*	Ellenburger, Ord	1949	40	3,630	3,630						
93	Diamond "M"(Clearfork), *Scurry*	Clearfork, Per	1949	80	5,037	5,037						
94	Diamond "M"(Canyon Line), *Scurry*	Canyon, Pen	1949	2,480	673,489	673,489						
95	Dixieland, *Reeves*	Delaware Mtn, Per	1948	100	30,873	17,982						
96	Dobbs, *Ward*	Queen, Per	1936	40	30,727	1,460						
97	Dockery, *Mitchell*	Ellenburger, Ord	1949	80	23,388	23,388						
98	Dollarhide(Clearfork), *Andrews*	Clearfork, Per	1949	400	85,755	85,755						
99	Dollarhide, *Andrews*	Dev	1945	1,480	2,970,965	1,177,209						
100	Dollarhide(Silurian), *Andrews*	Sil	1947	1,800	2,148,500	1,331,212						
101	Dollarhide((Ellenburger), *Andrews*	Ellenburger, Ord	1947	1,640	3,652,515	1,947,260						
102	Dollarhide, East (Devonian), *Andrews*	Dev	1949	40	3,712	3,712						
103	Dollarhide, East (Silurian), *Andrews*	Sil	1949	40	23,197	23,197						
104	Dora, *Gaines*	Clearfork, Per	1944	1,680	1,321,232	376,799						
105	Dora (Canyon), *Gaines*	Canyon, Pen	1949	120	62,601	62,601						
106	Dune, *Crane*	Grayburg-San Andres,Per	1938	3,040	2,378,774	424,000						
107	Dunn, *Mitchell*	Canyon, Pen	1949	40	2,477	2,477						
108	Early (Strawn Line), *Scurry*	Strawn, Pen	1949	80	20,311	20,311						
109	Eaves, *Winkler*	Yates-Seven Rivers,Per	1936	380	2,526,192	232,551						
110	Eden, *Concho*	Bend, Pen	1945	40	22,689	671						
111	Eden (gas), *Concho*	Strawn, Pen	1945				480	1,727.5	590.2			
112	Edwards, *Crane*	San Andres, Per	1935	1,640	707,683	162,321						
113	Eldorado, *Schleicher*	Wolfcamp, Per	1948	80	22,959	22,544						
114	Enlar (Permian), *Andrews*	Clearfork, Per	1942	1,040	1,565,330	118,196						
115	Enlar (Ellenburger), *Andrews*	Ellenburger, Ord	1942	1,920	8,167,088	956,002						
116	Iona, *Andrews*	Grayburg-San Andres,Per	1937	1,500	6,598,143	619,069						
117	Emperor, *Winkler*	Yates-Seven Rivers,Per	1936	1,800	5,371,690	288,675	100	363.6	2.9			
118	Emperor Deep, *Winkler*	Seven Rivers-Queen,Per	1940	1,160	1,431,077	76,933	4,000	34,148.1	2,925.0			
119	Emperor (Holt), *Winkler*	San Angelo, Per	1946	640	416,327	147,516	100	408.7	131.1			
120	Flanagan (Clearfork), *Gaines*	Clearfork, Per	1949	320	86,483	86,483						
121	Flanagan (Devonian), *Gaines*	Dev	1949	80	39,901	39,901						
122	Flanagan, *Gaines*	Ellenburger, Ord	1949	40	144,546	144,546						
123	Florence, *Runnels*	Strawn, Pen	1949	200	45,460	45,460						
124	Flying "A", *Winkler*	Dev	1949	80	43,785	43,785						
125	Fort Chadbourne, *Runnels* [e]	Strawn, Pen	1949	160	32,670	32,670						
126	Fort Chadbourne, West, *Coke* [e]	Strawn, Pen	1949	40	1,337	1,337						
127	Fort Stockton (Tansill), *Pecos*	Tansill, Per	1948	80	40,126	33,576						
128	Fort Stockton, *Pecos*	Yates-Seven Rivers,Per	1944	2,800	1,288,772	250,223	1,000	707.4	225.5			
129	Foster, *Ector*	Grayburg, Per	1932	13,080	58,058,148	5,998,181						
130	Frank Smith, *Hockley*	Pen	1934				160	880.0	4.2			
131	Freeman, *Runnels*	Palo Pinto, Pen	1948	20	5,538	3,004						
132	Frenne, *Pecos*	Queen-Grayburg, Per	1939	240	170,345	8,433						
133	Fuhrman Mascho, *Andrews*	Grayburg-San Andres,Per	1930	12,360	12,603,863	1,384,941	160	1,085.4	30.1			
134	Fullerton(San Andres), *Andrews*	San Andres, Per	1945	40	19,840	3,776						
135	Fullerton(Clearfork), *Andrews*	Clearfork, Per	1942	23,400	51,215,641	7,304,629						
136	Fullerton (Wichita Albany), *Andrews*	Wichita Albany, Per	1948	120	37,031	11,919						
137	Fullerton(Wolfcamp), *Andrews*	Wolfcamp, Per	1947	80	19,484	1,703						
138	Fullerton (8,300), *Andrews*	Dev	1944	3,000	6,583,279	1,581,819						
139	Fullerton(Ellenburger), *Andrews*	Ellenburger, Ord	1946	240	1,276,307	255,140						
140	Fullerton, North (Devonian), *Andrews*	Dev	1947	160	286,089	95,334						
141	Fullerton, South(Ellenburger), *Andrews*	Ellenburger, Ord	1948	520	979,843	807,621						
142	Fullerton, Yates, *Andrews*	Yates, Per	1943				800	243.3	-0-			
143	Gail, North, *Borden*	Spraberry, Per	1949	40	1,980	1,980						
144	Gail, South, *Borden*	Spraberry, Per	1949	40	956	956						
145	Garden City, *Glasscock*	Mis	1946	40	61,639	13,494						
146	Gartner, *Howard*	Strawn, Pen	1949	40	1,053	1,053						
147	Garza, *Garza*	San Andres, Per	1935	6,000	8,232,936	2,562,471						
148	Gib, *Crane*	Grayburg, Per	1948	100	36,626	18,254						
149	Geesecke, *Runnels*	Cisco, Pen	1949	20	1,325	1,325						
150	Goldsmith, *Ector*	San Andres, Per	1934	21,020	95,806,688	6,048,303	1,000	6,271.0	210.6			
151	Goldsmith (5,600), *Ector*	Clearfork, Per	1947	3,080	1,152,871	973,390						
152	Goldsmith (Clearfork), *Ector*	Clearfork, Per (4)	1946	3,400	3,655,821	1,563,266						
153	Goldsmith (Devonian), *Ector*	Dev	1947	200	303,500	244,960						
154	Goldsmith (Ellenburger), *Ector*	Ellenburger, Ord	1947	120	267,465	106,269						
155	Goldsmith, North, *Ector*	San Andres, Per	1936	520	265,660	19,318	100	1,789.3	7.8			
156	Goldsmith, North (Devonian), *Ector*	Dev	1946	200	480,457	88,174						

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT / NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
79	1	1	0	1	0		2,635	2,631		40.2	x	x	x	5,517	60		Devonian	5,517
80	143	1	1	4	59					38.0	2.4	D	10.0	2,394	60		San Andres, Per	3,000
81	696	21	0	259	421	4	1,800	x		32.0	1.7	D-S	10.0	4,406	200		Pennsylvanian	10,829
82	62	9	0	4	57		1,930	x		37.0	1.0	D-L	x	5,165	60		Pennsylvanian	10,829
83	313	74	2	49	238		1,740	x		34.0	1.7	D-S	x	4,367	225		San Andres, Per	5,500
84	2	0	0	0	2			x		36.8	x	S	x	1,004	50		Grayburg, Per	1,373
85	1	0	1	(Abandoned March, 1949)						30.6	x	D	x	2,820	80		Grayburg, Per	3,179
86	2	1	0	1	1			x		33.0	x	D	P	6,166	30		Wolfcamp, Per	8,800
87	72	3	4	5	61	1		x		31.0	1.7	D-S	P	1,467	80		San Andres, Per	1,635
88	2	0	0	0	2					41.0	x	D-L	P	3,290	45		Ellenburger, Ord	6,710
89	20	2	0	19	1		2,494	x		44.0	x	Gl-L	14.0	5,383	60		Ellenburger, Ord	6,710
90	26	0	1	3	18		1,800	x		32.0	x	D	P	4,432	100		Clearfork, Per	7,520
91	1	1	0	0	1			x		30.0	x	x	x	5,800	95		Clearfork, Per	7,520
92	1	1	0	0	1		3,750	2,027		46.5	x	x	x	8,240	40		Ellenburger, Ord	8,405
93	2	2	0	0	2					31.7	x	x	x	3,247	55		Canyon, Pen	6,617
94	62	62	0	62	0					43.6	x	x	5.13	6,736	45		Canyon, Pen	6,617
95	5	2	0	2	3					35.0	x	S	x	3,879	70		Delaware Mtn, Per	3,939
96	1	0	0	0	1					37.0	x	S	P	2,570	25		Grayburg, Per	2,600
97	2	2	0	1	1					45.2	x	x	x	7,998	5		Ellenburger, Ord	8,004
98	10	10	0	10	0					38.9	x	x	x	6,641	105		Devonian	8,792
99	74	32	0	73	1		3,252	2,589		40.0	x	Gl-D	7.8	8,106	120		Ellenburger, Ord	10,210
100	45	22	3	41	4		3,600	3,380		43.0	x	L	P	8,576	100		Ellenburger, Ord	10,210
101	41	18	0	41	0		4,310	3,990		43.0	x	D	P-F	10,095	200		Ellenburger, Ord	10,210
102	1	1	0	1	0					41.2	x	x	x	10,201	15		Fusselman, Sil	11,244
103	1	1	0	1	0					40.5	x	x	x	11,082	28		Fusselman, Sil	11,244
104	42	5	0	6	36		2,950	1,370		33.0	x	D	P	7,117	50		Wolfcamp, Per	9,049
105	3	3	0	2	1					47.0	x	x	x	8,952	100		Ordovician, Ord	11,881
106	76	16	0	2	73					30.0	1.5	D-L	P	3,346	170		San Andres, Per	3,795
107	1	1	0	0	1					47.0	x	x	x	7,587	20		Ellenburger, Ord	8,325
108	2	2	0	0	2					39.0	x	x	x	7,437	25		Strawn, Pen	7,548
109	19	0	0	0	19					26.0	x	S-SD	P	3,165	30		Grayburg, Per	3,185
110	1	0	0	0	1					33.0	x	L		4,216	20		Ellenburger, Ord	5,010
111	3	0	0			3	1,350	925				L		3,350	x			
112	41	2	0	6	34					35.0	x	D	P	3,554	40		San Andres, Per	3,695
113	2	1	0	2	0					32.0	x	x	x	4,137	20		Ellenburger, Ord	7,212
114	13	0	2	10	1		2,411	x		43.0	2.1	D	8.8	6,262	85		Pre-Cambrian	8,374
115	24	0	0	24	0		3,271	x		45.0	0.02	D	P-F	7,935	85		Pre-Cambrian	8,374
116	79	1	1	0	75		1,500	x		34.0	2.00	D	P	4,284	90		Clearfork, Per	5,619
117	91	1	0	64	24	1	1,360	x		32.0	0.55	S-SD	P	2,891	50		Tubb, Per	6,255
118	70	1	0	12	30	12				33.0	1.3	O D	P	3,014	50		Tubb, Per	6,255
119	18	2	1	14	2	1				40.0	0.4	L	P	4,823	85		Tubb, Per	6,255
120	8	8	0	4	4					38.2	x	x	x	7,233	55		Devonian	10,531
121	2	2	0	2	0					34.0	x	x	x	11,257	37		Ellenburger, Ord	12,267
122	1	1	0	1	0					40.8	x	x	x	12,267	132		Ellenburger, Ord	12,367
123	5	5	0	2	3					46.0	x	x	x	2,361	6		Strawn, Pen	2,361
124	2	2	0	2	0					38.4	x	x	x	9,721	114		Ellenburger, Ord	11,877
125	4	4	0	1	3					42.3	x	x	x	5,454	40		Strawn, Pen	5,625
126	1	1	0	0	1					42.0	x	x	x	5,377	7		Ellenburger, Ord	5,840
127	2	1	0	1	1					32.0	x	x	x	2,547	40		Delaware Mtn, Per	4,903
128	79	17	0	45	25	5	1,410	1,179		36.0	x	S-SD	20.0	2,918	55		Delaware Mtn, Per	4,903
129	661	5	3	30	624		1,740	x		34.0	1.1	D-S	11.0	4,244	110		Clearfork, Per	6,575
130	1	0	0			1	x	x						1,500	x		Pen	1,500
131	1	0	0	0	1					40.0	x	x	x	3,405	15		Pend, Pen	4,256
132	12	0	0	1	7					32.0	x	S-SD	P	1,448	50		Grayburg, Per	1,750
133	312	13	12	40	243	1	1,800	604		30.0	4.2	D	10.0	4,534	60		Ellenburger, Ord	11,960
134	1	0	0	0	1					35.0	2.0	D	P	4,650	205		Pre-Cambrian	10,828
135	587	5	3	523	60		2,940	1,593		43.0	0.5	D	10.5	7,122	245		Pre-Cambrian	10,828
136	3	1	0	2	1					44.0	x	x	x	7,888	35		Pre-Cambrian	10,828
137	2	0	1	0	1					41.0	x	D	P	8,080	30		Pre-Cambrian	10,828
138	75	6	0	61	13		3,624	x		40.0	x	D	P	8,598	125		Pre-Cambrian	10,828
139	6	0	1	4	1		4,071	x		40.0	0.15	D	x	9,979	78		Pre-Cambrian	10,828
140	4	1	0	4	0					43.8	x	D	x	8,219	60		Pre-Cambrian	10,828
141	13	7	0	13	0					44.6	x	D	x	10,783	110		Cam	11,169
142	5	0	0			5						S		3,100	x			
143	1	1	0	1	0					41.0	x	x	x	5,760	15		Pennsylvanian	8,231
144	1	1	0	0	1					35.0	x	x	x	6,998	30		Pennsylvanian	8,015
145	1	1	0	1	0		4,200	x		46.0	x	L	P	9,755	12		Pre-Cambrian	10,970
146	1	1	0	0	1					41.0	x	x	x	8,215	40		Ellenburger, Ord	8,562
147	323	58	0	2	298					29.0	0.51	D-L	P	2,990	50		San Andres, Per	3,608
148	7	1	2	0	5					29.4	x	x		2,837	40		Devonian	8,575
149	1	1	0	0	1					35.0	x	x		1,792	30		Ellenburger, Ord	3,647
150	1,096	14	3	880	165	5	1,768	1,044	G	36.0	1.9	D-L	10-15	4,223	120		Ellenburger, Ord	9,811
151	77	62	0	75	2					38.0	x	D	P	5,629	100		Ellenburger, Ord	9,811
152	85	23	0	71	14		2,600	x		40.0	0.5	D	10.0	6,292	110		Ellenburger, Ord	9,811
153	5	2	0	5	0					39.0	x	Gl-L	x	7,987	60		Ellenburger, Ord	9,811
154	3	1	0	3	0					46.0	x	D	P-F	9,545	70		Ellenburger, Ord	9,811
155	14	0	0	1	8	1				32.0	2.0	D-L	P	4,465	50		Silurian	8,314
156	5	0	0	3	1		3,300	2,347		43.0	x	x	x	8,019	40		Silurian	8,314

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
157	Goldsmith, North (Silurian), *Ector*	Sil	1946	160	315,430	90,285						
158	Good, *Borden*	Canyon, Pen	1949	360	203,451	203,451						
159	Grayson, *Reagan*	San Andres, Per	1928	240	876,837	26,989						
160	Halley, *Winkler*	Yates-Seven Rivers, Per	1934	1,120	2,492,418	215,810	320	899.2	109.4			
161	Harper, *Ector*	San Andres, Per	1933	3,720	10,867,514	280,151						
162	Harris, *Gaines*	Clearfork, Per	1949	40	2,501	2,501						
163	Hartgrove, *Concho*	Per	1927				100	181.6	15.6			
164	Heiner, *Pecos*	Ellenburger, Ord	1941	80	70,290	10,661						
165	Heiner, North, *Pecos*	Sil	1948	40	4,435	2,270						
166	Henderson, *Winkler*	Yates-Seven Rivers, Per	1933	2,860	13,044,773	317,588	480	531.4	81.0			
167	Hendrick, *Winkler*	Yates-Seven Rivers, Per	1926	8,320	213,756,549	1,269,835	160	4,333.9	1.7			
168	Hemleigh, *Scurry*	Ellenburger, Ord	1949	40	2,668	2,668						
169	Henan, *Gaines*	Yates, Per	1943				640	1,218.4	464.0			
170	Hoover, *Crockett*	Queen, Per	1938	160	27,996	6,466						
171	Howard Glasscock, *Howard & Glasscock*		1926	11,360	143,691,822	4,984,762						
172	1,400 ft pay	Yates, Per	1927									
173	1,800 ft pay	Seven Rivers, Per	1926									
174	2,200 ft pay	Grayburg, Per	1929									
175	2,500 ft pay	San Andres, Per	1928									
176	3,000 ft pay	Glorieta, Per	1928									
177	8,900 ft pay	Pen	1945									
178	Hurdle, *Upton*	Grayburg, Per	1936	360	323,360	12,404						
179	Iatan East Howard, *Howard & Mitchell*	San Angelo, Clearfork, Per	1926	8,860	25,608,955	797,654						
180	Iatan North, *Howard*	Clearfork, Per	1943	500	449,344	71,525						
181	Iolanthe, *Sterling*	Strawn, Pen	1948	40	2,264	1,114						
182	Irion, *Irion*	San Angelo, Per	1928	220	159,099	2,743						
183	Jameson, *Coke*	Pen	1946	2,880	2,685,644	1,469,050						
184	Jamison & Pollard, *Pecos*	Seven Rivers, Per	1941	140	174,418	25,278						
185	Jenkins, *Gaines*	Dev	1948	40	11,749	7,688						
186	Jiubart, *Runnels*	Cisco, Pen	1949	120	5,394	5,394						
187	Johnson, *Ector*	Grayburg, Per	1935	5,680	8,320,962	475,951						
188	Jones Ranch, *Gaines*	Dev	1945	640	1,440,504	457,261						
189	Jordan, *Crane & Ector*	San Andres, Per	1937	5,100	20,221,660	1,589,702	100	71.9	21.9			
190	Jordan 4,500, *Crane & Ector*	San Angelo, Per	1947	240	105,985	43,131						
191	Jordan (Tubb), *Ector*	Clearfork, Per	1948	640	336,505	214,475						
192	Jordan (Gimell), *Ector*	Simpson, Ord	1948	720	464,889	361,769						
193	Jordan (Ellenburger), *Ector*	Ellenburger, Ord	1947	960	759,533	415,686						
194	Kelley, *Scurry*	Canyon Reef, Pen	1948	2,080	419,899	419,474						
195	Kermit, *Winkler*	Yates-Seven Rivers, Per	1928	17,100	36,413,473	771,676	15,000	90,911.8	3,130.7			
196	Kermit (Ellenburger), *Winkler*	Ellenburger, Ord	1943	240	544,548	49,205						
197	Keystone (Colby Sand), *Winkler*	Queen, Per	1930	6,970	13,134,498	851,254	2,000	5,162.3	35.1			
198	Keystone (Lime), *Winkler*	Grayburg-San Andres, Per	1935	2,740	6,815,153	362,854	2,000	8,086.9	225.2			
199	Keystone (Holt), *Winkler*	San Angelo, Per	1943	4,240	7,770,189	1,782,498						
200	Keystone (Devonian), *Winkler*	Dev	1946	3,160	3,731,053	1,373,925						
201	Keystone (Silurian), *Winkler*	Sil	1945	1,920	2,790,977	1,028,502						
202	Keystone (Ellenburger), *Winkler*	Ellenburger, Ord	1943	6,120	41,991,258	5,539,505						
203	Keystone Waddell, *Winkler*	Waddell, Ord	1948				3,200	3,573.4	3,559.8			
204	Keystone, South, *Winkler*	Clearfork, Per	1948	320	135,613	124,879						
205	Kincaid, *Crockett*	Ellenburger, Ord	1948				100	-0-	-0-			
206	Lancaster Hill, *Crockett*	Grayburg, Per	1947	80	27,175	3,441						
207	Landon, *Cochran*	San Andres, Per	1945	440	296,681	130,573						
208	Landon (Strawn), *Cochran*	Strawn, Pen	1947	80	223,706	120,311						
209	Landon (Devonian), *Cochran*	Dev	1949	40	62,126	62,126						
210	Lawson Simpson, *Ector*	Clearfork, Per	1949	40	5,340	5,340						
211	Leck, *Winkler*	Yates-Seven Rivers, Per	1927	800	5,185,804	193,399						
212	Lee Harrison, *Lubbock* [h]	Clearfork, Per	1941	240	57,521	41,186						
213	Lehn-Apco 1,600, *Pecos*	Seven Rivers-Queen, Per	1939	1,800	906,216	48,105						
214	Lehn-Apco 1,600, North, *Pecos*	Queen, Per	1946	310	267,190	124,539						
215	Leonard, *Coleman & Runnels*	Cisco & Canyon, Pen	1945	480	148,040	50,326						
216	Levelland, *Cochran & Hockley*	San Andres, Per	1945	53,500	19,009,994	9,481,407						
217	Lion, *Ward*	Delaware Mtn, Per	1944	120	80,888	15,577	1,000	1,427.4	508.3			
218	Lobo, *McCulloch*	Cisco, Pen	1948	40	240	0			(Shut Down)			
219	Lutrick, *Hale* [h]	Cisco, Pen	1948	40	48,068	30,125						
220	Lyons, *Coke*	Strawn, Pen	1948	200	104,923	90,618						
221	Mabee, *Andrews*	Grayburg, Per	1943	3,800	5,441,293	825,175						
222	Magnolia Sealy, *Ward*	Yates-Seven Rivers, Per	1938	400	1,708,186	64,482						
223	Magnolia Sealy (South), *Ward*	Seven Rivers, Per	1940	727	1,606,544	106,246						
224	Martin (San Andres), *Andrews*	San Andres, Per	1940	600	237,677	19,022						
225	Martin (Wichita), *Andrews*	Wichita, Per	1945	80	210,980	15,701						
226	Martin (McKee), *Andrews*	Simpson, Ord	1945	800	715,716	399,803						
227	Martin (Ellenburger), *Andrews*	Ellenburger, Ord	1946	1,760	5,318,678	2,135,722						
228	Marvin, *Sterling*	Wichita-Albany, Per	1948	120	43,223	32,574						
229	Mason, *Loving*	Delaware Mtn, Per	1937	440	871,263	58,655						
230	Masterson, *Pecos*	Queen, Per	1929	1,200	1,223,660	30,834						
231	Masterson 3,500, *Pecos*	Clearfork, Per	1943	40	64,738	199			(Well plugged 8/14/49)			
232	McCamey, *Upton*	Grayburg, Per	1925	17,043	76,978,700	3,037,711						
233	McCamey (Ellenburger), *Upton*	Ellenburger, Ord	1948	40	37,005	29,346						
234	McCamey (Silurian), *Upton*	Silurian	1948				100	247.2	124.4			
235	McCandless-Clearfork, *Pecos*	Clearfork, Per	1946				640	851.0	34.4			
236	McCandless-Wichita, *Pecos*	Wichita, Per	1945				1,000	917.7	51.6			

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949 COMPLETED	1949 ABANDONED	OIL FLOWING	OIL ARTIFICIAL LIFT	GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY[j] PER CENT	DEPTH TO TOP OF PRODUCING ZONE FT[k]	PROD. THICKNESS AVG. FT / NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT
157	4	0	0	3	1					36.0	x	x	x	8,126	40		Silurian	8,314
										41.5	x	x					Canyon, Per	8,349
158	9	9	0	9	0					33.0	x	O D	P	3,099	25		Devonian	9,967
159	6	0	0	0	6					32.0	x	S-S D	P	2,887	100		San Andres, Per	3,896
160	62	1	0	24	35	2	1,316	x		36.0	1.2	D	P	4,211	75		San Andres, Per	4,518
161	186	0	0	3	183		1,430	x		31.9	x	x	x	7,520	15		Clearfork, Per	7,520
162	1	1	0	0	1							D		1,100	x		Per	1,100
163	1	0	0			1	x	175		35.0	x	D	x	5,508	200		Ellenburger, Ord	5,655
164	2	0	0	2	0					39.4	x	x	x	5,660	55		Ellenburger, Ord	8,460
165	1	0	0	0	1					29.0	1.1	D L	P	3,069	100		Queen, Per	3,300
166	146	0	5	26	47	3	1,350	x		28.0	1.5	O D	P-Can	2,917	300		Ellenburger, Ord	13,813
167	427	0	13	18	193	1	1,330	x	G	42.0	x	x		7,362	43		Ellenburger, Ord	7,357
168	1	1	0	0	1							S		3,420	x		Yates, Per	3,420
169	4	0	0			4	2,668	2,175		29.0	x	S-D	P	1,472	15		Ellenburger, Ord	8,440
170	8	0	0	2	2					x	2.2		P				Ellenburger, Ord	10,906
171	1,136	35	3	0	983													
172											1.0	S	P	1,280	25			
173											0.8	S	P	1,650	50			
174											1.6	O L	P	2,150	x			
175											0.9	O L	P	2,400	75			
176											3.4	O L	P	2,900	50			
177											x	L	P	8,910	x			
178	18	0	0	0	12					30.0	x	D	P	2,081	40		Graybarg, Per	3,085
179	447	0	10	0	434					30.4	1.4	D L	P	2,815	200		Wichita, Per	4,220
										28.0	1.4	D	P	2,861	75		Clearfork, Per	4,246
180	25	4	0	0	23					45.9	x	x	x	8,235	30		Ellenburger, Ord	8,444
181	1	0	0	0	1					28.0	x	S	P	1,432	10		Clearfork, Per	2,455
182	21	0	0	0	5					46.0	x	L	P	6,406	245		Ellenburger, Ord	7,141
183	72	30	0	67	5					24.0	x	D	P	2,029	4		San Andres, Per	2,550
184	7	0	0	2	3					27.0	x	x	x	9,180	100		Pre-Cambrian	11,705
185	1	0	0	0	1					42.0	x	x	x	2,370	10		Strawn, Pen	4,738
186	3	3	0	0	3					34.0	1.7	D	P	4,180	75		Clearfork, Per	6,100
187	142	0	4	17	108					42.0	x	D	P	11,369	250		Pre-Cambrian	13,025
188	8	0	0	8	0		4,600	x		32.0	2.1	D	P	3,475	150		Ellenburger, Ord	9,964
189	256	3	0	102	131	1	1,550	x		33.0	x	D	P	4,683	30		Ellenburger, Ord	9,964
190	6	1	0	4	2					42.2	x	D	x	5,290	35		Ellenburger, Ord	9,964
191	16	10	0	13	3					44.2	x	S	x	8,730	30		Ellenburger, Ord	9,964
192	18	10	0	18	0					42.0	x	D	x	8,911	80		Ellenburger, Ord	9,964
193	25	14	1	23	1					43.4	x	D L	7.64	6,812	225		Ellenburger, Ord	7,905
194	52	51	0	48	4					27.1	1.5	S-D	P	3,026	200		Ellenburger, Ord	10,896
195	909	0	10	49	487	54	1,450	x	G & W	43.1	x	D	P	10,698	225		Ellenburger, Ord	10,896
196	3	0	0	3	0		4,643	x		32.0	0.84	S-D	P	3,343	170		Ellenburger, Ord	10,756
197	395	13	0	164	154	3				35.7	0.8	D-S	P	3,458	150		Ellenburger, Ord	10,756
198	141	2	0	41	74	4	1,573	x										
							2,160	x		39.2	x	D	P	4,798	90		Ellenburger, Ord	10,756
199	106	4	0	96	9					32.3	0.55	C B-L	x	7,941	125		Ellenburger, Ord	10,756
200	80	8	1	64	15		3,375	2,680		38.7	0.55	L	P	8,149	175		Ellenburger, Ord	10,756
201	48	7	0	39	9		4,283	3,639		43.1	0.2	D	P	9,905	750		Ellenburger, Ord	10,756
202	153	0	4	142	6							S		8,900	x			
203	5	0	0			5	x	2,400				D		8,400	x			
204	8	6	0	5	3					34.3	x		P	6,385	120		Ellenburger, Ord	11,502
205	1	0	0			1								8,400	x		Ellenburger, Ord	9,091
206	3	0	1	0	2					32.1	x	D	P	1,624	18		San Andres, Per	2,300
207	11	9	0	0	11		1,758	x		30.0	1.8	D	13.0	5,060	40		Mississippian	11,166
208	2	0	0	2	0		4,098	x		39.0	x	L	P	10,541	160		Mississippian	11,166
209	1	1	0	1	0					38.4	x	x	x	10,955	42		Devonian	10,955
210	1	1	0	1	0					39.0	x	x	x	5,595	49		Clearfork, Per	5,595
211	39	1	1	1	19					26.6	1.64	D	P	3,124	150		San Andres, Per	3,962
212	6	4	0	2	4					28.0	x	D	P	4,997	25		Clearfork, Per	5,002
213	94	0	9	22	57					34.0	x	S	P	1,695	50		Graybarg, Per	1,787
214	31	0	0	25	6					34.0	x	x	P	1,968	50		Queen, Per	2,020
215	12	1	0	11	1					40.0	x	S	P	2,365	5		Ellenburger, Ord	4,103
														3,221	30			
216	1,279	300	1	432	842		1,775	982		30.0	x	D	10.0	4,874	160		San Andres, Per	5,050
217	5	0	1	2	0	2	x	1,750		35.5	x	S	P	4,818	15		Delaware Mtn, Per	4,994
218	2	0	0	0	2					38.6	x	x	x	215	3		Cisco, Pen	1,089
219	3	1	0	0	3					41.0	x	L	x	7,958	80		Pen	8,065
220	5	2	0	3	2					46.6	x	S	P	5,864	30		Ellenburger, Ord	7,047
221	99	0	3	0	93		2,090	x		30.9	2.19	D-S	P	4,723	50		San Andres, Per	4,807
222	53	0	4	0	47		1,445	x		32.0	x	S-D	P	2,948	70		Graybarg, Per	3,175
223	26	0	3	7	10					28.1	x	O D	P	2,924	50		Graybarg, Per	3,281
224	15	0	1	2	11					35.8	x	D	P	4,405	40		Ellenburger, Ord	9,160
225	2	0	0	0	2		2,672	x		33.0	x	D	P	7,023	50		Ellenburger, Ord	9,160
226	19	9	0	12	7		3,500	1,970		36.0	0.69	S	P	8,452	30		Ellenburger, Ord	9,160
227	45	7	0	40	5		3,725	3,429		43.1	0.21	D	P-F	8,913	150		Ellenburger, Ord	9,160
228	3	0	1	0	2					26.4	x	D	x	4,293	90		Ellenburger, Ord	8,280
229	11	1	0	2	8					39.0	0.12	S	P	3,945	45		Delaware Mtn, Per	4,165
230	120	0	2	0	22					28.1	1.4	S	P	1,481	40		Ellenburger, Ord	5,356
231	1	0	1	0	0		1,701	x		22.8	x	D	P-F	3,540	17		Clearfork, Per	3,557
232	1,364	6	9	0	880					28.1	2.2	D-L	P	2,281	80		Ellenburger, Ord	8,358
233	1	0	0	1	0					43.0	x	D	x	8,090	60		Ellenburger, Ord	8,358
234	1	0	0			1	x	x						7,075	x		Ellenburger	8,358
235	1	0	0			1	1,080	x				D	x	2,600	x		x	
236	2	0	0			2	1,500	x				D	x	3,000	x		x	

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS TO END OF 1949	BARRELS DURING 1949	AREA PROVED ACRES	MILLION CU. FT[c] TO END OF 1949	MILLION CU. FT[c] DURING 1949		TO END OF 1949	DURING 1949
237	McElroy, *Crane & Upton*	Grayburg, Per	1926	19,711	193,474,542	8,135,103						
238	Mckee, *Crane*	Simpson, Ord	1942	120	137,987	5,299						
239	McMillan, *Runnels*	Pen	1927	500	972,507	1,650						
240	Means, *Andrews*	Grayburg-San Andres, Per	1934	930	16,122,310	1,503,961						
241	Means Yates, *Andrews*	Yates, Per	1935				600	4,688.4	110.3			
242	Midland Farms, *Andrews*	Grayburg, Per	1944	3,200	4,550,635	1,658,221						
243	Midland South, *Midland*	Wichita, Per	1947	40	12,408	3,190						
244	Midway Lane, *Crockett*	Ellenburger, Ord	1947	1,520	2,624,282	1,310,128						
245	Miers, *Sutton*	Strawn, Pen	1946				640	9.1	9.1			
246	Millican, *Coke*	Strawn, Pen	1948	400	160,619	152,568						
247	Monahans (Clearfork), *Ward*	Clearfork, Per	1945	2,189	1,494,367	340,038						
248	Monahans (Permian), *Ward*	Clearfork, Per	1942	80	145,831	19,790						
249	Monahans (Ellenburger), *Ward*	Ellenburger, Ord	1942	280	2,518,196	301,587						
250	Monahans No(Glorietta), *Winkler*	San Angelo, Per	1946	80	106,541	8,571						
251	Monahans North, *Winkler*	San Angelo-Clearfork, Per	1944	240	256,068	22,565						
252	Monroe, *Ward*	Delaware Mtn, Per	1930	80	122,450	6,918						
253	Moore, *Howard*	Grayburg, Per	1937	840	271,733	29,821						
254	Morita, *Howard*	Grayburg, Per	1944	160	10,005	0		(Last well plugged 2/2/49)				
255	Mund Lake, *Terry*	Cisco, Pen	1949	80	24,168	24,168						
256	Murray-Stevens, *Runnels*	Strawn, Pen	1949	40	4,141	4,141						
257	Neal Ranch, *Upton*	Wolfcamp, Per	1948	40	38,793	36,794						
258	Nelson (Wichita), *Andrews*	Wichita, Per	1948	40	14,391	13,551						
259	Nelson, *Andrews*	Ellenburger, Ord	1946	560	816,622	265,700						
260	Netterville, *Pecos*	Yates, Per	1934	440	509,170	15,772						
261	Noelke, *Crockett*	Seven Rivers, Per	1940	1,060	1,542,010	86,232	1,000	235.8	59.8			
262	North Miles, *Runnels*	Canyon, Per	1949	40	308	308						
263	Norton, *Runnels*	Strawn, Pen	1949	40	276	276						
264	Oates, *Pecos*	Rustler, Per	1947	80	18,684	5,888						
265	Oliver, *Schleicher*	Strawn, Pen	1948	40	973	101		(Well abandoned June, 1949)				
266	Olson, *Crockett*	Grayburg-San Andres, Per	1940	1,020	827,193	236,425	300	140.5	13.9			
267	Orient, *Pecos*	Yates, Per	1948	360	43,210	29,441						
268	Ownby, *Yoakum*	San Andres, Per	1941	1,960	2,252,861	309,892						
269	Page, *Schleicher*	Strawn, Pen	1939	760	1,542,123	455,028	1,120	18,491.9	239.2			
270	Parker, *Andrews*	San Andres, Per	1935	200	179,349	27,080						
271	Parker West, *Andrews*	Dev	1948	360	223,729	184,231						
272	Payton, *Pecos & Ward*	Yates, Per	1937	1,523	4,238,772	118,795						
273	Pecos Valley I. C, *Pecos*	Yates, Per	1928	1,234	1,514,332	62,138						
274	Pecos Valley H.C, *Pecos & Ward*	Yates, Per	1928	2,830	3,303,279	521,620						
275	Pecos Valley(Ellenburger), *Pecos*	Ellenburger, Ord	1949	40	14,373	14,373	40	2.6	2.6			
276	Pegasus, *Upton*	Ellenburger, Ord	1949	320	260,420	260,420						
277	Pennell, *Ector*	San Andres, Per	1930	6,226	30,463,888	725,842	100	179.3	1.1			
278	Pennell 4500, *Ector*	Clearfork, Per	1948	40	7,573	5,357						
279	Pennell (Ellenburger), *Ector*	Ellenburger, Ord	1946	80	111,761	35,112						
280	Petersburg, *Hale*	Cisco, Pen	1947	40	68,167	11,875						
281	P.H.D., *Garza*	San Andres, Per	1944	560	199,778	33,289						
282	Pierce, *Crockett*	Ellenburger, Ord	1948				300	33.2	17.6			
283	Polar, *Kent*	Ellenburger, Ord	1946	160	91,068	9,693						
284	Pullian, *Tom Green*	Canyon, Pen	1949	40	394	394						
285	Prote, *Ward*	Yates-Seven Rivers, Per	1942	80	208,901	14,118						
286	Rhodes, *Cochran*	San Andres, Per	1941	80	42,727	2,749						
287	Richards, *Pecos*	Yates, Per	1929	60	34,447	216						
288	Riley (Clearfork), *Gaines*	Clearfork, Per	1947	40	10,274	2,850						
289	Riley North, *Gaines*	Clearfork, Per	1947	840	380,306	265,805						
290	Riley North Yates, *Gaines*	Yates, Per	1948				100	0.7	0.7			
291	Robertson, *Gaines*	San Angelo-Clearfork, Per	1942	1,320	970,990	414,256						
292	Robertson (Devonian), *Gaines*	Dev	1949	40	5,720	5,720						
293	Rose Ranch, *King*	Strawn, Pen	1944	680	1,693,802	287,642						
294	Russell 6,100, *Gaines*	Clearfork, Per	1945	1,840	2,262,481	59,988						
295	Russell 7,400, *Gaines*	Clearfork, Per	1943			397,913						
296	Russell No (Devonian), *Gaines*	Dev	1948	40	50,294	45,908						
297	Rustler Pills, *Culberson*	Rustler, Per	1948	30	0	0		(Well shut in)				
298	San Benito, *Coke*	Marble Falls, Pen	1948	40	39,229	15,470						
299	Sand Hills (McKnight), *Crane*	San Andres, Per	1935	1,520	2,316,425	611,583	640	4,905.0	99.7			
300	Sand Hills (Tubb), *Crane*	Clearfork, Per	1930	11,574	23,232,141	2,843,740						
301	Sand Hills (Ordivician), *Crane*	Simpson-Ellen, Ord	1935	1,400	3,245,695	257,027						
302	Sand Hills West, *Crane*	San Angelo, Per	1943	200	40,480	7,431						
303	Sand Hills (Ellen) West, *Crane*	Ellenburger, Ord	1936	520	986,677	52,151						
304	Santa Rosa, *Pecos*	Ellenburger, Ord	1948				1,000	423.3	239.6			
305	Scarborough, *Winkler*	Yates, Per	1927	2,780	8,808,858	169,999	1,000	50.0	50.0			
306	Scarborough No, *Winkler*	Grayburg, Per	1948	380	268,652	160,580						
307	Schattel, *Scurry*	Canyon, Pen	1948	40	26,290	10,591						
308	Scott, *Ward*	Delaware Mtn, Per	1946	40	1,979	162						
309	Seminole, *Gaines*	San Andres, Per	1937	14,270	53,262,018	5,282,742						
310	Seminole (San Angelo), *Gaines*	San Angelo, Per	1947	80	56,089	29,997						
311	Seminole Yates, *Gaines*	Yates, Per	1937				2,000	14,623.8	6.5			
312	Seminole West, *Gaines*	San Andres, Per	1948	1,360	317,235	296,550	8,000	8,617.3	3,400.5			
313	Shafter Lake, Yates, *Andrews*	Yates-Seven Rivers, Per	1938									
314	Shafter Lake (Clearfork), *Andrews*	Clearfork, Per	1948	80	24,875	21,390						
315	Shafter Lake (Wolfcamp), *Andrews*	Wolfcamp, Per	1948	1,360	1,043,794	610,980						
316	Shafter Lake(Devonian), *Andrews*	Dev	1947	2,320	3,509,495	2,166,569						

LINE NUMBER	NUMBER OF WELLS[a]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[m] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l]	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED[f]	ABANDONED	FLOWING	ARTIFICIAL LIFT													
237	886	45	12	30	824		750	x	W	30.0	2.4	D	P-F	2,993	150		Ellenburger, Ord	12,786
238	3	0	0	0	3		2,681	x		42.1	x	S	P	6,149	60		Ellenburger, Ord	7,204
239	25	0	0	1	0					37.0	x	S	P	2,525	20		Ellenburger, Ord	4,506
240	233	17	0	57	163		1,900	1,270		32.0	2.4	D	P	4,531	90		San Andres, Per	5,205
241	2	0	0			2	3,550	x	x			S		2,950	x		x	
242	80	43	0	2	76		1,960	x		33.0	x	D	8.5	4,796	80		San Andres, Per	4,942
243	1	0	0	0	1		5,300	x		40.0	x	D	P	8,565	70		Devonian	11,445
244	38	8	0	25	10		3,270	x		46.1	x	D	P	7,602	135		Ellenburger, Ord	7,690
245	1	0	0			1	1,620	x				x	x	4,270	60		Ellenburger, Ord	6,170
246	10	8	0	10	0					45.4	x	x	6.15	5,984	45		Ellenburger, Ord	7,155
247	37	0	0	33	3		1,990	x		37.8	1.5	D	13.0	4,964	150		Ellenburger, Ord	10,545
248	2	0	0	2	0					35.0	0.6	x	P	5,665	40		Ellenburger, Ord	10,545
249	7	0	1	5	1		4,600	x		47.0	0.4	D	F-P	10,398	215		Ellenburger, Ord	10,545
250	2	0	0	0	2					35.0	x	L	P	5,223	109		Ellenburger, Ord	10,545
251	6	0	0	6	0		2,659	x		37.0	x	D	10.5	6,217	200		Ellenburger, Ord	10,545
252	2	0	0	1	0					29.1	0.1	S	P	4,670	10		Delaware Mtn, Per	
253	21	0	3	0	13					38.0	2.3	D-L	P	3,266	40		Ellenburger, Ord	10,366
254	4	0	2	0	0					25.0	x	D-L	P	3,270	10		San Andres, Per	3,585
255	2	2	0	0	2					43.0	x	x	x	9,433	33		Ellenburger, Ord	11,845
256	1	1	0	1	0					47.0	x	x	x	4,520	4		Strawn, Pen	4,520
257	1	0	0	1	0					46.1	x	x	x	10,218	40		Ellenburger, Ord	12,543
258	1	1	0	0	1					34.6	x	x	x	7,365	105		Ellenburger, Ord	10,685
259	7	0	0	0	7		4,225	2,641		43.0	x	D	P	10,535	174		Pre-Cambrian	10,606
260	22	0	2	8	4					34.0	x	S	P	2,354	30		Grayburg, Per	2,750
261	56	3	0	6	34	3				32.0	x	S	P	1,314	25		San Andres, Per	2,877
262	1	1	0	0	1					42.0	x	x	x	4,310	12		Strawn, Pen	4,310
263	1	1	0	0	1					44.5	x	x	x	4,428	20		Strawn, Pen	4,428
264	2	0	0	0	2					18.1	x	D	x	847	55		Hustler, Per	847
265	1	0	1	0	0					36.5	x	x	x	5,700	60		Ellenburger, Ord	6,150
266	53	10	0	0	50	2	x	400		25.0	x	D	P	2,092	40		San Andres, Per	2,322
267	9	0	4	0	5					37.4	x	S	x	1,712	45		Yates, Per	2,826
268	49	0	0	21	27		1,638	903		31.0	1.6	D	P	5,313	60		San Andres, Per	5,502
269	46	3	1	6	29	7	x	900		38.0	x	L	20.0	5,690	70		Ellenburger, Ord	6,380
270	5	1	0	0	5					29.2	x	D	P	4,712	25		Ellenburger, Ord	10,398
271	9	6	0	7	2		3,400	x		36.1	x	D	x	8,291	40		Ellenburger, Ord	10,398
272	143	0	4	4	100				W	33.0	1.1	S	P	2,079	40		Yates, Per	2,313
273	83	0	0	8	55					25.0	1.7	S	P	1,625	25		Simpson, Ord	7,480
274	283	86	1	150	72					38.0	1.1	S	P	1,648	60		Simpson, Ord	7,480
275	2	2	0	1	0	1	x	x		43.6	x	x	x	8,157	186		Ellenburger, Ord	8,210
276	4	4	0	4	0					53.0	x	x	x	12,820	120		Ellenburger, Ord	13,295
277	201	3	0	51	133	1	1,400	576		35.0	2.6	D	P	3,659	100		Ellenburger, Ord	9,357
278	1	0	0	1	0					32.9	x	x	x	4,450	50		Ellenburger, Ord	9,357
279	2	0	0	1	1					44.0	0.2	D	x	8,989	90		Ellenburger, Ord	9,357
280	1	0	0	0	1					39.0	x	L	x	6,992	50		Pre-Cambrian	8,394
281	14	0	0	0	7	x	1,185	x		38.0	x	D	P	3,607	60		Pre-Cambrian	9,600
282	1	0	0			1	5,178	x				D	x	11,750	x		Ellenburger, Ord	11,972
283	4	0	0	0	2		3,500	x		38.5	x	D	x	7,838	165		Ellenburger, Ord	7,938
284	1	1	0	0	1					37.9	x	x	x	5,552	30		Canyon, Pen	5,552
285	2	0	0	2	0		1,430	x		20.0	1.8	D-S	P	2,842	20		Queen, Per	3,100
286	2	0	0	0	1					29.0	x	D	P	5,111	20		San Andres, Per	5,150
287	3	0	0	0	3					27.0	x	x	x	1,320	20		San Andres, Per	4,360
288	1	0	0	0	1					33.1	x	D	P	7,251	192		Clearfork, Per	7,251
289	21	13	0	4	17		2,751	1,778		31.0	x	D	P	6,991	27		Clearfork, Per	7,299
290	1	0	0			1	1,500	x				S		3,025	x			
291	33	12	0	4	29					29.0	2.6	D-S	P	6,372	60		Wichita, Per	7,699
292	1	1	0	1	0		2,206	x		36.0	x	x	x	10,069	13		Ellenburger, Ord	12,080
293	17	0	1	11	5					37.0	x	x	10.0	5,341	60		Pre-Cambrian	6,601
294	46	5	0	6	35		x	2,124		33.5	x	D	P	6,143	40		Devonian	11,205
295							2,273	1,276				D	P	7,762	125		Devonian	11,205
296	1	1	0	0	1					41.6	x	x	x	11,190	65		Devonian	11,205
297	1	0	0	0	1					30.0	x	x	x	484	10		Hustler, Per	484
298	2	0	1	0	1					46.0	x	x	x	6,519	20		Ellenburger, Ord	6,868
299	39	7	0	24	17	1	1,511	x		35.0	1.6	D	P	3,395	80		Ellenburger, Ord	7,891
300	320	20	0	220	89		1,200	1,085		34.0	1.1	D	P	4,573	200		Ellenburger, Ord	7,891
301	35	0	3	12	16					37.0	0.2	D-S	F	5,912	20		Ellenburger, Ord	7,891
302	5	2	0	0	5					33.0	x	D	P	4,905	25		Ellenburger, Ord	7,891
303	13	0	3	2	3					44.0	0.1	D	C	5,998	100		Ellenburger, Ord	7,891
304	3	0	0			3	x	x						9,200	x		Ellenburger, Ord	x
305	142	3	0	15	96	3	1,450	x		33.1	1.0	S-D	P	3,023	75		Grayburg, Per	3,600
306	19	4	0	17	2					36.8	x	x	x	3,292	50		Grayburg, Per	3,339
307	1	0	0	1	0					44.1	x	x	x	6,891	75		Ellenburger, Ord	8,110
308	1	0	0	1	0					40.0	x	S	P	4,910	20		Delaware Mtn, Per	4,920
309	338	3	0	294	39		2,025	1,506		35.0	1.8	D	P	5,282	175		Wolfcamp, Per	9,312
310	2	1	0	0	2					27.6	x	x	P	6,567	124		Wolfcamp, Per	9,312
311	3	0	0			3	2,643	x				S		3,250	x			
312	34	30	0	33	1		2,020	1,988		34.4	x	D	x	5,167	160		Wolfcamp, Per	9,312
313	38	0	0			38	1,940	1,650				S-D		3,000	x			
314	2	1	0	0	2					34.0	x	x	10.0	6,925	110		Ellenburger, Ord	11,898
315	34	1	4	18	12					40.7	x	x	x	8,500	50		Ellenburger, Ord	11,898
316	58	20	1	21	36					38.2	x	L-D	x	9,889	140		Ellenburger, Ord	11,898

TABLE 1 – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR WEST TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION AREA PROVED ACRES	OIL PRODUCTION BARRELS TO END OF 1949	OIL PRODUCTION BARRELS DURING 1949	GAS PRODUCTION AREA PROVED ACRES	GAS PRODUCTION MILLION CU FT TO END OF 1949	GAS PRODUCTION MILLION CU FT DURING 1949	GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl TO END OF 1949	CONDENSATE PRODUCTION Thousands of Bbl DURING 1949
317	Shafter Lake (Ellenburger), *Andrews*	Ellenburger, Ord	1948	400	637,892	627,451						
318	Shannon (Grayburg), *Crockett*	Grayburg, Per	1940	220	11,829	1,201						
319	Shannon (San Andres), *Crockett*	San Andres, Per	1943	920	693,226	199,020	200	8.7	-0-			
320	Sharon Ridge 1,700, *Scurry*	San Andres, Per	1923	7,000	3,631,633	1,094,585						
321	Sharon Ridge 2,400, *Scurry*	San Angelo-Clearfork, Per	1938	2,820	2,584,032	195,999						
322	Sharon Ridge (Canyon), *Scurry*	Canyon Reef, Pen	1949	1,000	284,955	284,955						
323	Shearer, *Pecos*	Seven Rivers, Per	1938	480	1,782,885	46,554						
324	Shearer 1,700, *Pecos*	Grayburg, Per	1949	40	6,788	6,788						
325	Shipley, *Ward*	Seven Rivers-Queen, Per	1928	2,380	8,585,617	395,190	1,000	1,098.4	16.4			
326	Shipley (Silurian), *Ward*	Sil	1940	80	98,989	6,064						
327	Siler-Johnson, *McCulloch*	Pen	1938				300	175.1	5.7			
328	Simpson, *Crockett*	Seven Rivers, Per	1938	180	33,156	14,381						
329	Slaughter, *Cochran, Hockley & Terry*	San Andres, Per	1936	74,250	144,906,954	13,270,273	1,000	329.4	101.7			
330	Smyer, *Hockley*	Clearfork, Per	1944	2,120	702,374	541,984						
331	Snyder, *Howard*	San Angelo, Per	1935	1,870	3,632,984	136,706						
332	Snyder North, *Scurry*	Canyon Reef, Pen	1948	6,720	2,818,375	2,813,870						
333	Snyder No (Strawn), *Scurry*	Strawn, Pen	1949	40	12,171	12,171						
334	Snyder No(Ellenburger), *Scurry*	Ellenburger, Ord	1949	40	832	832						
335	South Sealy Yates, *Ward*	Yates, Per	1946	560	197,817	83,539						
336	Spade, *Sterling*	Ellenburger, Ord	1948	40	11,659	4,830						
337	Spencer, *Ward*	Yates-Seven Rivers, Per	1943	600	515,485	50,174						
338	Spraberry, *Dawson*	San Andres, Per	1946	440	211,213	43,625						
339	Spraberry Deep, *Dawson*	Spraberry, Per	1949	280	98,837	98,837						
340	Stennett, *Lubbock*	Clearfork, Per	1942	40	9,771	5,134						
341	Susan Peak, *Tom Green*	Strawn, Pen	1948	1,760	294,712	293,435						
342	Talpa, North, *Runnels*	Strawn, Pen	1949				160	1.1	1.1			
343	Tankersley, *Irion*	Des Moines, Pen	1945	80	96,891	14,724						
344	Taylor Link, *Pecos*	Yates-Queen-San Andres, Per	1929	2,800	10,601,595	288,636	160	0.2	0.2			
345	T C I (San Andres), *Pecos*	San Andres, Per	1949	60	8,673	8,673						
346	T C I (Waddell), *Pecos*	Waddell, Ord	1949	40	2,568	2,568						
347	Tex Harvey, *Midland*	Spraberry, Per	1949	40	20,949	20,949						
348	Tennyson, *Coke*	Ellenburger, Ord	1948	240	11,471	606	(Last well plugged - 11/25/49)					
349	Three Bar, *Andrews*	Dev	1945	1,200	1,781,884	793,926						
350	Tippett, *Crockett*	Wolfcamp, Per	1947	400	265,298	150,685	300	30.7	11.5			
351	Toburg, *Pecos*	Cre	1929	3,700	12,727,129	1,689,475						
352	Todd Deep (Granoidal), *Crockett*	Strawn, Pen	1940	1,320	4,763,064	575,840						
353	Todd Deep(Ellenburger), *Crockett*	Ellenburger, Ord	1945	2,600	12,400,027	2,631,003						
354	Tucker, *Crane*	Simpson, Ord	1946	280	360,702	223,911						
355	Tunstall, *Reeves*	Delaware Mtn, Per	1947	1,520	1,275,774	777,142	100	43.6	15.6			
356	T X L (Upper Clearfork), *Ector*	Clearfork, Per	1946	2,600	1,141,149	685,918						
357	T X L (Wolfcamp), *Ector*	Wolfcamp, Per	1946	40	8,182	1,774						
358	T X L (Devonian), *Ector*	Dev	1945	5,480	22,061,406	5,377,739						
359	T X L (Silurian), *Ector*	Fusselman, Sil	1947	160	293,080	127,467						
360	T X L (Ellenburger), *Ector*	Ellenburger, Ord	1945	6,400	39,563,160	10,160,820						
361	Union, *Andrews*	Wichita, Per	1943	1,400	3,062,416	406,718						
362	University Blk 39, *Crockett*	Pen	1947	40	7,892	213	40		4.4	2.7		
363	Vaughn, *Crockett*	Grayburg-San Andres, Per	1947	1,800	146,268	144,044						
364	Vealmoor, *Howard*	Pen	1948	920	561,623	409,398						
365	Verhalen, *Reeves*	Wolfcamp, Per	1947	40	4,184	0	(Well temporarily abandoned)					
366	Vincent, *Howard*	Clearfork-Wichita, Per	1943	120	27,415	0	(Last well plugged - 4/3/48)					
367	Waddell, *Crane*	Grayburg-San Andres, Per	1927	5,160	12,776,583	1,080,493	4,000	4,071.1	60.8			
368	Waddell Ellis, *Crane*	Grayburg, Per	1940	600	314,758	57,935						
369	Waddell Univ (Dev), *Crane*	Dev	1949	40	35,252	35,252						
370	Waddell Univ (Ellen), *Crane*	Ellenburger, Ord	1947	560	1,642,616	913,464						
371	Walker, *Pecos*	Queen-Grayburg, Per	1940	1,820	2,743,228	221,015						
372	Waples-Platter, *Yoakum*	San Andres, Per	1939	680	482,893	50,024						
373	Ward 'n-Estes, *Ward & Winkler*	Yates-Seven Rivers, Per	1929	9,156	67,165,223	2,784,973	1,500	7,157.1	179.7			
374	Ward, South, *Ward*	Yates-Seven Rivers, Per	1930	5,360	31,420,708	437,979	1,500	2,294.1	6.1			
375	Warfield, *Midland*	Ellenburger, Ord	1949	40	7,906	7,906						
376	Wasson "51", *Gaines & Yoakum*	San Andres, Per	1936	58,479	194,422,486	18,765,034	0	1,747.7	-0-			
377	Wasson "66", *Gaines*	Clearfork, Per	1940	1,040	2,389,490	447,359						
378	Wasson "72", *Gaines & Yoakum*	Clearfork, Per	1941	520	714,509	37,290						
379	Water Valley (San Andres), *Tom Green*	San Andres, Per	1948	40	5,611	5,191						
380	Webb Bay, *Upton*	Grayburg, Per	1935	120	76,287	2,343						
381	Weiner (Colby Sand), *Winkler*	Queen, Per	1941	2,640	2,321,047	126,815	2,000	3,319.2	1,677.5			
382	Welch, *Dawson*	San Andres, Per	1936	6,920	4,991,627	1,125,291						
383	Westland, *Coke*	Ellenburger, Ord	1948	40	5,365	2,738						
384	Wentz, *Pecos*	Ellenburger, Ord	1941	80	147,105	10,895						
385	West, *Yoakum*	San Andres, Per	1938	40	97,868	5,265						
386	Westbrook, *Mitchell*	Clearfork, Per	1921	4,460	13,071,623	216,600						
387	Westerman, *Pecos*	Yates, Per	1938				100	898.5	42.1			
388	Wheat, *Loving*	Delaware Mtn, Per	1925	2,360	10,771,413	246,592						
389	Wheeler (Devonian), *Winkler*	Dev	1945	2,120	4,704,553	1,377,093						
390	Wheeler (Silurian), *Winkler*	Sil	1946	160	147,532	58,869						
391	Wheeler (Ellenburger), *Winkler*	Ellenburger, Ord	1943	1,680	7,011,977	1,590,613						
392	White & Baker, *Winkler*	Queen, Per	1935	1,800	1,743,360	244,352	1,000	4,906.6	166.5			
393	White & Baker (Strawn), *Pecos*	Strawn, Pen	1945	40	35,505	3,322						
394	Wilshire, *Upton*	Wolfcamp, Per	1948	40	12,534	10,114						
395	Winfield, *Scurry*	Mis	1949	40	4,712	4,712						

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG.-/END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT./WELL	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
317	10	9	0	10	0					42.9	x	x	x	11,798	160		Ellenburger, Ord	11,898
318	11	0	0	0	3					29.0	x	D	P	2,171	30		Ellenburger, Ord	8,440
319	47	2	0	1	36	1		350		36.0	x	D	P	2,201	4		Ellenburger, Ord	8,440
320	540	84	1	10	489					28.1	2.1	D-S	P	1,751	50		Ellenburger, Ord	8,090
321	141	1	0	8	122					28.1	0.9	D	P	2,503	50		Ellenburger, Ord	8,238
322	25	25	0	25	0		3,135	2,948		44.7	x	x	x	6,676	30		Canyon, Pen	6,680
323	48	0	2	0	41					35.2	x	S	P	1,403	30		Graybarg, Per	1,750
324	2	2	0	0	2					30.0	x	x	x	1,708	5		Graybarg, Per	1,708
325	155	3	0	10	140	2	x	x		35.0	1.8	S-D	P	2,787	80		Ellenburger, Ord	9,187
326	2	0	0	0	2		3,281	x		32.0	0.3	L	P	7,075	65		Ellenburger, Ord	9,187
327	1	0	0			1	585	x				S		1,560	x			
328	9	0	0	0	8					26.0	x	D-S	P	1,705	24		Graybarg, Per	1,720
329	2,323	117	2	1,575	671	3	1,775	999		32.3	1.09	D	12.21	5,011	100		Clearfork, Per	7,000
330	53	40	0	0	53					25.0	x	D	8.7	5,953	25		Clearfork, Per	6,000
331	111	4	0	0	107					31.0	1.7	D-S	P	2,844	50		Pennsylvanian	6,419
332	168	167	0	168	0		3,107	x		45.5	x	Gav	8.36	6,857	425		Ellenburger, Ord	8,405
333	1	1	0	1	0					45.1	x	x		7,500	14		Ellenburger, Ord	8,405
334	1	1	0	0	1					36.0	x	x		7,735	22		Ellenburger, Ord	7,735
335	14	4	0	8	6					34.0	x	S		2,838	10		Graybarg, Per	3,281
336	1	0	0	0	1					47.0	x	D		7,980	30		Ellenburger, Ord	7,980
337	15	0	0	3	10		3,540	3,538		30.0	1.6	S-D	P	2,928	48		Seven Rivers	3,000
338	11	0	0	0	11		960	x		32.1	x	L		3,916	165		Clearfork, Per	7,679
339	7	7	0	7	0					35.0	x	x		6,736	150		Ellenburger, Ord	11,136
340	1	0	0	0	1					26.5	x	x		5,372			Clearfork, Per	5,372
341	44	43	0	39	5					36.2	x	x	x	4,778	60		Ellenburger, Ord	8,297
342	1	0	0			1	x	x				L	x	3,500	x		Ellenburger, Ord	4,198
343	2	0	0	0	2					48.0	0.1	L	P	7,225	5		Ellenburger, Ord	8,357
344	181	1	0	8	145	1	700	x		29.0	1.3	D-S	P	1,583	105		San Andres, Per	1,957
345	3	3	0	3	0					35.1	x	x	x	2,237	80		Ellenburger, Ord	6,603
346	1	1	0	1	0					41.7	x	x	x	6,600	10		Ellenburger, Ord	6,603
347	1	1	0	0	1					40.2	x	x	x	8,055	205		Ellenburger, Ord	12,055
348	6	0	4	0	0					47.0	x	x	x	6,202	20		Ellenburger, Ord	6,219
349	30	11	0	29	1		3,174	x		40.0	x	C-H-L	19.2	8,245	55		Ellenburger, Ord	10,466
350	11	5	0	10	0	1	2,774	x		41.0	x	Ca	P	6,252	56		Ellenburger, Ord	7,796
351	743	116	12	41	658		108	x		19.0	1.9	S	P	457	10		Trinity Sd	610
352	33	0	0	20	13		2,600	x		40.5	0.2	L	11.7	5,994	50		Ellenburger, Ord	7,143
353	65	6	0	59	6		2,720	2,270		42.0	0.2	D	10.0	6,196	88		Ellenburger, Ord	7,143
354	7	2	0	7	0					52.0	x	S	x	5,827	70		Simpson, Ord	6,303
355	85	39	0	80	4	1				42.0	x	S	P	3,318	60		Delaware, Mtn	3,350
356	65	34	0	35	30		2,137	x		36.0	0.35	D	6.0	5,774	80		Ellenburger, Ord	11,506
357	1	0	0	0	1					34.2	x	D	P	7,720	70		Ellenburger, Ord	11,506
358	137	22	0	112	25		2,300	x		40.0	0.4	C-H	F-P	8,006	175		Ellenburger, Ord	11,506
359	4	0	0	4	0					34.0	x	I	P	8,582	50		Ellenburger, Ord	11,506
360	160	5	1	143	14		4,010	x		44.0	0.2	D	F-P	9,791	200		Ellenburger, Ord	11,506
361	36	0	1	2	32		3,000	x		43.1	x	D	P	7,438	150		Ellenburger, Ord	8,545
362	2	0	0	0	1	1				43.0	x	x	x	8,070	26		San Andres, Per	9,000
363	45	42	0	24	21					19.0	x	x	x	1,397	1		Pennsylvanian	1,501
364	23	16	0	22	1					43.3	x	x	x	7,859	75		Pennsylvanian	7,974
365	1	0	0	0	1					43.0	x	L	P	10,853	120		Wichita, Per	14,073
366	3	0	1	0	0					27.0	x	L-D	10.0	4,635	20		San Andres, Per	6,172
367	202	4	0	123	41	5	1,550	x		35.1	0.22	D	P	3,516	150		San Andres, Per	4,002
368	15	5	1	0	14					34.0	x	D	P	3,383	100		San Andres, Per	4,002
369	1	1	0	1	0					39.9	x	x	x	9,234	130		Ellenburger, Ord	11,060
370	14	4	0	14	0					46.2	x	D	x	10,885	300		Ellenburger, Ord	11,060
371	91	2	0	31	57					39.9	1.4	S	20.0	2,063	210		Ellenburger, Ord	11,080
372	17	0	0	0	14		1,465	596		32.0	1.5	D	P	5,290	15		San Andres, Per	5,515
373	993	23	2	210	610	3	1,375	x		35.0	1.8	S	P	2,784	85		San Andres, Per	3,819
374	538	0	6	22	406	2				32.4	1.3	S	P	2,449	175		Mississippian	10,009
375	1	1	0	1	0					46.9	x	x	x	13,130	81		Ellenburger, Ord	13,374
376	1,611	12	0	1,368	232	0	1,850	1,214		34.0	1.6	D	10.0	5,158	250		Ellenburger, Ord	11,108
377	26	0	1	1	21		2,128	x		32.0	1.4	D	P	6,863	320		Ellenburger, Ord	11,108
378	13	0	1	0	5		2,513	x		35.0	1.0	D	P	7,616	200		Ellenburger, Ord	11,108
379	1	0	0	0	1					35.0	x	x	x	1,645	10		Ellenburger, Ord	7,838
380	6	0	0	0	1					25.0	x	B-L	P	2,109	13		San Andres, Per	2,176
381	73	0	2	45	16	7	1,270	x		33.0	x	S	12.0	3,140	20		Graybarg, Per	3,180
382	173	12	0	0	167					33.0	x	D	P	4,926	40		San Andres, Per	4,980
383	1	1	0	0	1					40.2	x	x	x	6,250	20		Ellenburger, Ord	6,250
384	2	0	0	0	2		1,399	x		33.0	x	D	P	4,383	135		Pre-Cambrian	4,634
385	1	0	0	0	1					31.0	x	D	x	5,255	35		San Andres, Per	5,195
386	223	0	1	0	157					25.0	3.9	D	P	3,108	100		Ellenburger, Ord	8,201
387	1	0	0			1	x	900					x	2,900	x			
388	118	2	0	15	63					38.0	0.2	S	P	4,279	20		Delaware Mtn, Per	5,093
389	53	6	1	45	7		3,575	x		38.0	0.8	C-H-L	P	8,357	300		Ellenburger, Ord	10,813
390	4	0	0	3	1		3,825	x		39.0	x	L	P	9,246	85		Ellenburger, Ord	10,813
391	42	0	0	35	2		4,635	x		45.0	0.2	D	P	10,627	200		Ellenburger, Ord	10,813
392	91	0	1	57	21	1	800	x		30.0	x	S	20.0	1,785	40		Ellenburger, Ord	9,811
393	1	0	0	1	0					40.0	x	L	x	8,026	48		Ellenburger, Ord	9,811
394	1	0	0	0	1					36.7	x	x	x	8,005	100		Ellenburger, Ord	13,977
395	1	1	1	0	1					39.8	x	x	x	8,390	20		Pre-Cambrian	8,922

TABLE 1 – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR WEST TEXAS

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	BARRELS		AREA PROVED ACRES	MILLION CU FT[c]				
					TO END OF 1949	DURING 1949		TO END OF 1949	DURING 1949		TO END OF 1949	DURING 1949
396	Winters, *Runnels*	Pen	1943	20	20,881	1,498						
397	Winters (Strawn), *Runnels*[7]	Strawn, Pen	1949	20	3,398	3,398						
398	Winters North, *Runnels*	Cisco, Pen	1949	260	83,873	83,873						
399	Wurld, *Crockett*	Grayburg, Per	1925	3,440	13,380,183	1,111,070						
400	Wyatt, *Crockett*	San Andres, Per	1933	100	81,416	5,465						
401	Yarborough & Allen, *Ector*	Ellenburger, Ord	1947	800	1,075,904	666,533						
402	Yates (Smith Sand), *Pecos*	Yates, Per	1933	520	859,037	58,759						
403	Yates, *Pecos*	Grayburg-San Andres, Per	1926	21,500	360,757,074	11,820,702	500	677.6	7.0			
404	Yellowhouse, *Hockley*	San Andres, Per	1944	1,720	782,746	294,311						

FOOTNOTES

1 Collins consolidated with Early (Strawn Lime)
2 Wingate consolidated with Fort Chadbourne
3 Fort Chadbourne, West, formerly Davenport
4 Andector (Clearfork) consolidated with Goldsmith (Clearfork) on 12/13/48)
5 Lee Harrison formerly Lubbock
6 Lutrick formerly West Petersburg
7 Winters (Strawn) formerly Winters (Canyon)
8 All gas production is from Gas Wells on pressure base of 14.65 psi

LINE NUMBER	NUMBER OF WELLS[e]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT.[l] NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
396	1	0	0	0	1					42.0	x	S	P	2,520	16		x	4,735
397	1	1	0	1	0					46.0	x	x	x	3,944	6		Ellenburger, Ord	4,668
398	13	13	0	1	12					41.0	x	x	x	2,825 2,918 3,057	14 20 40		Ellenburger, Ord	5,191
399	172	18	0	0	136					29.0	0.7	D	P	2,625	50		San Andres, Per	3,695
400	5	0	0	0	1		555	x		23.0	0.7	D	10.0	1,331	20		Strawn, Pen	7,143
401	20	10	0	19	1		4,662	4,497		40.0	x	D	x	10,788	24		Ellenburger, Ord	10,900
402	26	0	0	0	21		110	x		33.0	1.5	S	P	986	40		Ellenburger, Ord	9,114
403	606	8	0	525	66	1	700	480		30.0	1.6	D	C-P	1,452	220		Ellenburger, Ord	9,114
404	43	7	0	1	42		1,507	x		30.0	2.0	D	11.0	4,610	15		San Andres, Per	4,685

TABLE 2 - SUCCESSFUL WILDCATS AND EXTENSIONS DRILLED IN WEST TEXAS DURING 1949

LINE NUMBER	COUNTY	1949 COMP. DATE	LOCATION SEC.	LOCATION BLK.	LOCATION SUV.	DEPTH TO TOP OF PAY, FT.	COMPANY	LEASE AND WELL NO.	PRODUCING FORMATION	INITIAL PRODUCTION PER DAY OIL, BBL.	INITIAL PRODUCTION PER DAY GAS, THOUSANDS CU. FT.	CHOKE FRACTIONS	TOTAL DEPTH, FT.	DEEPEST HORIZON TESTED
1	Andrews	4-10	12	13	Univ Lds	9,814	Kewanee Oil	Univ of Tex "C" #1	Dev	355	765.0		9,944	Dev
2	Andrews	4-21	4	A-36	P S L	11,905	McAlester Fuel	M.M. Fisher #1	Dev	5		Gas Lift	11,397	Dev
3	Andrews	5-17	15	12	Univ Lds	8,210	The Texas	State of Texas "B" #1	Dev	25	13.5	Pump	8,450	Sil
4	Andrews	6-15	14	A-32	P S L	(C) 6,545	Cities Service	E.P. Cowden "L" #1	Lower Clearfork	492	268.1		8,792	Sil
						(D) 7,755			Per & Dev	291	352.1			
5	Andrews	8-26	17	A-32	P S L	(S) 8,518	Pure Oil	E.P. Cowden "A" #26-SE	Sil & Ellen,	230	57.0	19/64	10,170	Ellen, Ord
						(E) 10, 112			Ord	132	77.7	17/64		
6	Andrews	8-30	16	A-32	P S L	(C) 6, 502	Pure Oil	E.P. Cowden "A" #28-E	Lower Clearfork	229	179.0	18/64	8,760	Dev
						(D) 7,927			Per & Dev	176	218.0	32/64		
7	Andrews	10-14	12	A-35	P S L	(D) 10, 186	Magnolia Pet	E.P. Cowden "I" #18	Dev & Fusselman,	38	59.8	1	11,244	Sil
						(S) 11,000			Sil	242	149.3	3/8		
8	Andrews	12-29	37	42, T-1-N	G&MMB&A	4,750	Stanolind	David Fasken "I" #1	Grayburg, Per	55	0.9	Pump	4,906	Grayburg, Per
9	Borden	2-7	24	31, T-4-N	T & P	6, 490	H.L. Hunt	Clayton & Johnson #1	Spraybery, Per	19	4.8	Pump	8,015	Ellenburger, Ord
10	Borden	3-29	22	31, T-6-N	T & P	5, 730	H.L. Hunt	Clayton & Johnson "I" #1	Spraybery, Per	40	16.0		8,231	Ellenburger, Ord
11	Borden	4-14	37	33, T-4-N	T & P	7,905	Seaboard etal	T.V. Good #1	Canyon Ls, Pen	488	334.3	1/4	8,010	Canyon Ls, Per
12	Borden	6-18	45	32, T-6-N	T & P	9,818	Sinclair Prairie	Sterling Williams #1	Dev	663	437.6		10,035	Ellenburger, Ord
13	Borden	12-21	103	25	H & T C	7, 100	Amerada	Von Roeder #1	Canyon Ls, Pen	218	192.9		7,556	Strawn, Per
14	Cochran	2-22	40		Harrison & Brown	5,025	Coy & Hanon	D.C. Reed #1	San Andres, Per	50		Pump	5,250	San Andres, Per
15	Cochran	3-26	13	L	P S L	10,913	Stanolind	J.F. Edwards #2	Dev	237	12.1	3/16	10,955	Dev
16	Cochran	6-25	Lab. 14	Lge 130	Carson	4,846	H.G. Maxey	St. Clair #1	San Andres, Per	49	14.6		4,880	San Andres, Per
17	Cochran	7-14	Tr 8	Lge 130	Carson	4,835	Cain & Maxey	L.S. Poulan #1	San Andres, Per	188	300.8	1	4,883	San Andres, Per
18	Cochran	7-30	Lab. 18	Lge 133	Armstrong	4,986	Atlantic	F.O. Yaster #1-C	San Andres, Per	90	20.4	Pump	5,093	San Andres, Per
19	Cochran	11-19	Lab. 27	Lge 97	Brewster	4,745	DeKalb Agr Assoc	Seaboard-Wright #1	San Andres, Per	39	71.0	1/2	4,906	San Andres, Per
20	Coke	1-4	453	1-A	H & T C	4,960	Humble	R.Hickson #2	Palo Pinto, Per	563	198.7	1/4	4,990	Palo Pinto, Per
21	Coke	1-31	22		Gutierrez	6,240	Shamrock	W.C. Wendland #1	Ellenburger, Ord	24		Pump	6,250	Ellenburger, Ord
22	Coke	4-29	525		Brockheyser	5,954	Sun	State #1	Canyon, Per	706	445.8	1/4	6,248	Strawn, Per
23	Coke	5-13	450	1-A	H & T C	5, 127	Placid Oil	B. Foreman #1	Strawn, Per		21,700.0		5, 158	Strawn, Per
24	Coke	7-24	331		N.Eastland	4,375	Humble	J.L. Brunson #1	Palo Pinto, Per	54	10.3	Pump	5,864	Granite, Pre-Cam
25	Coke	10-16	475		S. Clark	5, 369	Barnsdall	H.Davenport #1	Strawn, Per	24		Pump	5,840	Ellenburger, Ord
26	Coke	11-12	521		V. Hanson	6, 414	A.G. Hill	B. Harris #6	Pen	82	71.3	Pump	6,875	Ellenburger, Ord
27	Coke	11-19	704		Garza	5,520	Humble	S. Odom #3	Strawn, Per	37		Pump	5,542	Strawn, Per
28	Crane	2-24	27	B-22	P S L	3,520	Gulf	H. Connell #3-G	San Andres, Per	199	79.2	3/8	3,549	San Andres, Per
29	Crane	5-11	3	31	Univ	9,040	Gulf	University "B" #4-D	Dev	529	686.9	1/2	11,080	Ellenburger, Ord
30	Crane	10-17	16	2	H & T C	5,470	Humble	Jay Cowden #1-B	Dev	224	147.2	3/4	5,522	Dev
31	Crockett	1-17		Lge 3	Archer	2, 125	Fred Turner	Shannon Est. #1	Yates, Per		3,000.0		2,130	Yates, Per
32	Crockett	3-25	1	P F	B & V	1,945	C.W. Brown	A.C. Hoover #1-G	Grayburg, Per	15		Pump	2,190	Grayburg, Per
33	Crockett	3-25	5	U V	G C & S F	1,430	Oliver & Kotyza	Shannon #1-A	Grayburg, Per	61	111.1	3/16	1,467	Grayburg, Per
34	Crockett	7-19	50		G.W. Brown	11, 770	Texas	Pierce #1	Ellenburger, Ord		4, 400.0		11,966	Ellenburger, Ord
35	Crockett	7-21	27	U V	G C & S F	1, 392	Archie Bean	Archie Bean #1	San Andres, Per	23		Pump	1,405	San Andres, Per
36	Dawson	1-22	47	34, T-5-N	T & P	6, 420	Seaboard	S.E. Lee #2	Spraybery, Per	319	239.3	1/4	11,060	Ellenburger, Ord
37	Ector	1-9	3	43, T-3-S	T & P	4, 110	Forest Oil	W.B. Henderson #1	Grayburg, Per	224	162.0	1-3/4	4,300	Grayburg, Per
38	Ector	2-3	5	43, T-3-S	T & P	4, 140	Amerada	Del. "F" #1	Grayburg, Per	138			4,220	Grayburg, Per
39	Ector	2-28	7	35	Univ	5, 230	Gulf	Univ Fogelson "A" #3	Tubb, Per	530	516.2	1/2	5,255	Tubb, Per
40	Ector	3-23	41	42, T-2-S	T & P	4, 380	Guy Malee	L.K. Colbert #1	Grayburg, Per	305			4,720	Grayburg, Per
41	Ector	6-13	14	44, T-1-S	T & P	5, 320	Phillips	C.Cowden #106	Upper Clearfork, Per	992	478.1	1/2	5,825	Clearfork, Per
42	Ector	6-24	25	45, T-1-S	T & P	5,740	Forest Oil	Phillips, Tyl #1	Upper Clearfork, Per	200	124.0		6,300	Clearfork, Per
43	Ector	8-11	29	44, T-1-N	T & P	(UCF)-6, 135	General American	C.Scharbauer #1	Upper Clearfork,	353	543.6	1/4	6,301	Tubb, Per
						(Tubb)-5, 496			Per & Tubb, Per	251	431.0	3/8		
44	Ector	10-21	44	44, T-1-S	T & P	5, 540	Edw. C. Lawson	A. Barrow #1	Upper Clearfork, Per	452	504.2	1/2	5,595	Clearfork, Per
45	Gaines	1-20	8	A-23	P S L	12, 174	Shell	W.L. Haskins #1	Ellenburger, Ord	711	160.0	1	12, 706	Ellenburger, Ord
46	Gaines	4-21	3	A-22	P S L	5,940	Texas	A.R. Wharton #1	Glorietta, Per	80	8.0	Pump	6, 535	Clearfork, Per
47	Gaines	7-8	4	A-24	P S L	8,850	Ralph Lowe	H. Cunningham #1	Canyon, Per	704	211.9	3/4	11,881	Ellenburger, Ord
48	Gaines	7-22	8	A-23	P S L	7, 145	Shell	W.L. Haskins #2	Clearfork, Per	89	41.8	Pump	7, 260	Clearfork, Per
49	Gaines	7-28	12	A-23	P S L	7, 140	Geo Livermore	Read #1	Clearfork, Per	233	81.6		10, 531	Ellenburger, Ord
50	Gaines	8-30	370	G	(CSD & RR)	5,040	Cities Service	Richardson #1	San Andres, Per	132	365.6	1/2	5, 150	San Andres, Per
51	Gaines	9-13	9	A-23	P S L	(C) 7, 180	Magnolia	Flanagan Est. #1	Clearfork, Per	404	312.3	1/2	12, 255	Ellenburger, Ord
						(D) 10, 345			& Dev	537	5.4	1/2		
52	Gaines	10-29	17	A-22	P S L	5,965	Texas	Harris #1	Glorietta, Per	41		Pump	7,520	Clearfork, Per
53	Gaines	12-12	19	A-34	P S L	10,050	Sinclair etal	Andrews "A" #1-E	Lev	255	6.9	7/32	12,080	Ellenburger, Ord
54	Gaines	12-24	7	A-10	P S L	6, 390	Mid Continent	Nichols #1	Clearfork, Per	97	43.7	Pump	7,510	Clearfork, Per
55	Garza	3-26	1, 225		E L & R R	3,021	Brown etal	Robinson #1	San Andres, Per	77		Pump	3,122	San Andres, Per
56	Garza	5-17	1,233		E L & R R	2,967	Brown etal	Williams #1	San Andres, Per	74	15.2	Pump	3,124	San Andres, Per
57	Garza	7-18	1,231		E L & R R	2,957	Comanche Corp	Williams #3	San Andres, Per	87	21.5	Pump	3,128	San Andres, Per
58	Garza	9-2	1,231		E L & R R	3,038	Comanche Corp	Lynetal #3	San Andres, Per	84	23.1	Pump	3,114	San Andres, Per
59	Garza	10-7	726		B.Hall	3, 397	Berman & George Brown	G.W. Bassinger #1	San Andres, Per	86			3,640	San Andres, Per
60	Howard	6-13	67	20	LaVaca Nav	8, 190	Magnolia Pet	Gartner "A" #1	Bend, Miss	61		Pump	8, 542	Ellenburger, Ord
61	Kent	12-29	736	97	H & T C	6, 800	J.A. Chapman	D.M. Cantell #1	Canyon, Ls, Pen	266	318.3	1/2	6,857	Canyon Ls, Per
62	Loving	3-18	17	55, T-1	T & P	3,860	Intercoast Pet	T.P. Ld & Tr. #1	Delaware Sd, Per	39			3,974	Delaware Sd, Per
63	Loving	6-15	17	56, T-1	T & P	3,522	Davis etal	Del. "B" #1	Delaware Sd, Per	45	13.5	Pump	3,600	Delaware Sd, Per
64	Lubbock	9-9	22	D	L.S.V.B.B.	6, 100	Slick-Moorman	Cloud #1	Tubb, Per	36		Pump	6, 144	Tubb, Per
65	Midland	2-1	20	40, T-2-S	T & P	13,049	Texas	C. Schaefgen #1	Ellenburger, Ord	39	26.8	5/8	13, 374	Ellenburger, Ord
66	Midland	2-24	15	37, T-3-S	T & P	7,850	Tex Harvey	H.W. Floyd #1	Spraybery, Per	135	44.0		12,063	Ellenburger, Ord
67	Mitchell	7-13	17	20, T-1-S	T & P	7,984	Superior Oil	J.B. Dockery #1	Ellenburger, Ord	172	51.9	11/64	9,004	Ellenburger, Ord
68	Mitchell	10-11	64	20	LaVaca Nvg	7,565	Standard of Tex	B.F. Dunn #1	Canyon Lime, Pen	510	640.0	1/2	8,325	Ellenburger, Ord
69	Mitchell	11-29	4	21, T-1-S	T & P	7,987	Superior Oil	Jim Plaster #2	Ellenburger, Ord	338	33.5	11/64	7,992	Ellenburger, Ord
70	Pecos	2-1	1	194	G C & S F	1,795	J.L. & B.H. Cooper	Wilson #1	Grayburg, Per	40	12.0		1,495	Grayburg, Per
71	Pecos	2-24	35	10	H & G N	1,990	Conder Pet	Go Abell #1	Seven Rivers, Per	10		Pump	2,005	Seven Rivers, Per
72	Pecos	2-25	22	9	H & G N	5,478	E.A. Hall	E. Abell #1	McKee, Ord	432	233.7	1/4	5,500	McKee, Ord
73	Pecos	2-26	22	10	H & G N	1,578	R.J. Bernstrom	Pecos Valley Co #3	Yates, Per	38	56.8	3/4	1,641	Yates, Per
74	Pecos	3-3	31	10	H & G N	1,547	D.W. Smith	Iowa Realty Trust #1	Yates, Per	41	8.6	3/4	1,564	Yates, Per
75	Pecos	3-12	14	140	T & St.L.	2,300	Texas	J.R. Bennett etal #4	Tansill, Per	72			2,593	Tansill, Per
76	Pecos	3-30	89	194	G C & S F	1,982	Helmerich & Payne	White Baker "C" #3	Grayburg, Per	20			2,018	Grayburg, Per

LINE NUMBER	COUNTY	1949 COMP. DATE	LOCATION SEC.	LOCATION BLK.	LOCATION SURV.	DEPTH TO TOP OF PAY, FT.	COMPANY	LEASE AND WELL NO.	PRODUCING FORMATION	INITIAL PRODUCTION PER DAY Oil, Bbls.	INITIAL PRODUCTION PER DAY Gas, Thousands Cu.Ft.	CHOKE FRACTIONS	TOTAL DEPTH, FT.	DEEPEST HORIZON TESTED
77	Pecos	4-3	54	10	H & G N	1,380	C.S.Messinger et al	L.L. Byrne "B" #4	Yates, Per	20	6.4		1,392	Yates, Per
78	Pecos	4-27	104	10	H & G N	1,696	Childress Royalty	J.S. Masterson #3	Grayburg, Per	75	8.3		1,708	Grayburg, Per
79	Pecos	4-29	3	213	Ashmore	1,333	Gulbenson & Irwin	San Pedro Land Co #1	Yates, Per	16	30.0		1,370	Yates, Per
80	Pecos	5-6	28	9	H & G N	5,006	Mobil Power O & R	L.G. Lessenich #1	Montoya, Ord	561	485.8	14/64	5,030	Montoya, Ord
81	Pecos	6-18	106	8	H & G N	685	J.S. Abercrombie	Lucie Love #1-S	Hustler, Per	2		Pump	628	Hustler, Per
82	Pecos	7-1	106	194	C T & M C	520	McGurdy & Easter	J.R. Tippett #1-T	x	11		Pump	553	x
83	Pecos	7-25	25	9	H & G N	(OIL) 4,944	Magnolia Pet	J.F. Walker-Acct #2, #1	Upper Walker, Ord & Waddell, Ord	15	88.3	10/64	5,940	Ellenburger, Ord
						(GW) 5,455				57	64.4	17/64		
84	Pecos	8-22	106	8	H & G N	1,659	J.S. Abercrombie	Lucie Love #2	Yates, Per	27	14.5	1/4	1,709	Yates, Per
85	Pecos	10-2	36	3	H & T C	7,971	Fullerton Oil	None Prod Co #1-D	Ellenburger, Ord	305	317.6	3/4	8,210	Ellenburger, Ord
86	Pecos	10-7	13	3	H & T C	(GAS) 2,220	Richardson & Bass	Tex Cotton Indus #1	San Andres, Per & Waddell, Ord	95	31.1		6,403	Ellenburger, Ord
						(OIL) 6,143				56	53.2			
87	Pecos	10-22	52	10	H & G N	1,415	Gulbertson& Irwin	J.W. Brown "B" #1	Yates, Per	134	150.1	1/4	1,425	Yates, Per
88	Pecos	10-25	106	8	H & G N	1,615	J.S. Abercrombie	Lucie Love #1	Yates, Per		5,230		2,703	San Andres, Per
89	Pecos	10-28	15	146	T & St. L	2,907	Louis Crouch	H.J. Eaton #1	Yates, Per	33		Pump	2,953	Yates, Per
90	Pecos	12-1	15	3	H & T C	1,964	Nei. - Tex	Mallidy #1	Queen, Per	61	19.2	7/32	1,992	Queen, Per
91	Pecos	12-4	14	3	H & T C	2,259	Paul Davis	State-Corrigon #1	San Andres, Per	5		Pump	2,300	San Andres, Per
92	Pecos	12-10	73	10	H & G N	1,679	Nash & McKay	Iowa Realty Trust#1-A	Queen, Per	82	41.0	1/2	1,720	Queen, Per
93	Pecos	12-28	78	11	H & G N	4,753	La Gloria	L.L. Cresse #1	Waddell, Ord	105			5,100	Ellenburger, Ord
94	Reagan	1-19	14	12	Univ Lds	2,390	Hunt & Moore Exp	University "B" #1	Grayburg, Per	10		Pump	2,481	Grayburg, Per
95	Reagan	2-8	46	Y	M K & T	10,584	Plymouth	J.S. Elliott #1-46	Bend, Per	257	2,009.7	1/2	10,618	Bend, Per
96	Reagan	5-14	?		Peter Leach	7,400	Plymouth	Dixon #1-2	Lower Leonard, Per	18		Pump	12,354	Ellenburger, Ord
97	Reagan	10-29	45	Y	M K & T	10,678	Plymouth	E. Johnson #2-45	Bend, Per	392	3,786.3	5/16	10,765	Bend, Per
98	Runnels	1-5	SURVEY		Day L & C.Co	2,369	M.J. Florance	E.W. Gray #1	Cisco, Per	142		Pump	2,396	Cisco, Per
99	Runnels	3-22		121	J. Hughes #227	1,780	H. Easterwood	Gamecke #2	Cisco, Per	54		Pump	1,952	Cisco, Per
100	Runnels	4-5			E.Lassiter#174	4,056	British Amer Oil	C.B. Hays #1	Bend, Per	34	10.2	Pump	4,450	Ellenburger, Ord
101	Runnels	4-12			J.Hensley #83	2,811	G.W. Strake	B.A. Jacob #1	Cisco, Per	433	105.2	1/2	2,825	Cisco, Per
102	Runnels	4-13	120		A.G. Wills	3,467	Maisee Drlg	M. Jameson #1	Strawn, Per	10	2,366.0		4,198	Ellenburger, Ord
103	Runnels	4-15			E T & R #178	3,800	E.P. Griffin	B. Clayton #1	Strawn, Per		2,890.0		3,977	Strawn, Per
104	Runnels	6-22			F.Sosa #302	5,435	Humble	S. Odom #1	Bend, Per	330	969.0	1/4	5,490	Bend, Per
105	Runnels	6-26			J. Hensley #83	3,015	Geo.W. Strake	B.A. Jacob #2	Cisco, Per	91			3,057	Cisco, Per
106	Runnels	6-27			J. Hensley #83	2,896	Geo.W. Strake	B.A. Jacob #4	Cisco, Per	108	16.2	1/4	2,918	Cisco, Per
107	Runnels	7-8	Sur. 52		D.Diaz #532	3,722	Chapman &McFarlin	L. Dunkworth #1	Strawn, Per	624		3/4	3,972	Strawn, Per
108	Runnels	7-30			J.Jeffried#293	5,252	F.W. Manning	S.L. McNay #1	Strawn, Per	55	40.7		5,625	Ellenburger, Ord
109	Runnels	7-30			J.Hensley #83	3,840	G.W. Strake	C.W. Collum #1	Cisco, Per	50			7,942	Strawn, Per
110	Runnels	9-6	521		D. Moses	3,905	Herring Drlg	A.L. Aldridge #1	Strawn, Per	124	109.1	1/4	3,919	Strawn, Per
111	Runnels	9-9			J.C.McKean#534	2,349	Wood Drlg	H. Vogler #1	Cisco, Per	125		Pump	2,366	Cisco, Per
112	Runnels	10-3			J.R.Merrill#70	3,368	H.B. Ousley Drlg	E.O. Herring #2	Strawn, Per	339	336.0	3/16	3,373	Strawn, Per
113	Runnels	10-26	2		B.W. Taylor	3,938	Humble O & R	B. Herndon #1	Strawn, Per	167	180.4	1/2	4,668	Ellenburger, Ord
114	Runnels	11-19	292		J.M. Garcia	5,290	W.H. Hass, Jr	S.L. McNay #1	Bend, Per	147	32.0	3/16	5,330	Bend, Per
115	Runnels	11-23	81		C T R R	4,500	T.W. Murray	Wm Stevens #1	Strawn, Per	1,652	1,125.0	3/4	4,520	Strawn, Per
116	Runnels	11-24	93		S.Herring Hears	3,934	Drlg & Exp	W.R. Gross #1	Canyon, Per	7	1.4	Pump	4,310	Strawn, Per
117	Runnels	11-28			Burnett #771	4,381	Sells Pet	W.W. Mitchell #1	Strawn, Per	12			4,427	Strawn, Per
118	Runnels	12-17			G.Carrol #386	5,288	Powell & Murray	Odem Est. #1	Bend, Per	1,833	964.0	3/4	5,332	Bend, Per
119	Schleicher	5-28	18	M	G H & S A	5,790	Ohio Oil	A.L. Baugh #1	Strawn, Per	50		Pump	6,775	Ellenburger, Ord
120	Scurry	1-6	197	97	H & T C	6,569	Lion Oil	C.T. McLaughlin #2	Canyon, Per	650	538.9	1/4	6,617	Canyon, Pen
121	Scurry	1-19	207	97	H & T C	6,845	Magnolia Pet	H.G. Moore #1	Canyon, Per	161	118.0	10/64	6,885	Canyon, Pen
122	Scurry	2-14	123	97	H & T C	2,244	R.D. Colston	T.J. Sterling #1	San Andres, Per	40		Pump	2,519	San Andres, Per
123	Scurry	2-15	37	1	Kirkland&Fields	6,795	Pagnolia Pet	Winston Bros #1	Canyon, Per	57	4.2	Pump	7,005	Ellenburger, Ord
124	Scurry	2-23	438	97	H & T C	7,050	Humble O. & R.	Perriman #1	Canyon, Per	241	294.0	22/64	7,093	Canyon, Pen
125	Scurry	2-28	440	97	H & T C	6,578	Standard of Texas	J.W. Brown "2" #2	Canyon, Per	752	600.1	22/64	6,870	Canyon, Pen
126	Scurry	3-4	164	97	H & T C	6,650	Humble O & R	R. Bishop #1	Canyon, Per	349	298.7	3/8	6,680	Canyon, Pen
127	Scurry	4-13	26	1	J.P. Smith	7,520	Placid Oil	J.R. Early #1	Strawn, Per	391	125.1	1/4	7,548	Strawn, Pen
128	Scurry	4-25	492	97	H & T C	8,200	Humble O. & R.	J.A. Moore "B" #1	Ellenburger, Ord	47		Pump	8,404	Ellenburger, Ord
129	Scurry	4-25	30		J.P. Smith	6,535	Sunray Oil	R.B. Brown #1	Canyon, Per	432	432.0	1/2	6,644	Canyon, Pen
130	Scurry	5-5	442	97	H & T C	7,310	J.L. Collins	G.E. Parks #1	Strawn, Per	513	327.7	1/2	7,329	Strawn, Pen
131	Scurry	5-13	209	97	H & T C	6,773	Magnolia Pet	A.B. Eicke #1	Canyon, Per	166	133.8	10/64	6,778	Canyon, Pen
132	Scurry	5-19	183	97	H & T C	6,745	Ohiasotha O & G	Wilson #1	Canyon, Per	305	152.5	3/8	6,761	Canyon, Pen
133	Scurry	6-22	198	97	H & T C	6,686	Lion Oil	Strom #1	Canyon, Per	352	247.1	1/4	6,715	Canyon, Pen
134	Scurry	6-30	11		J.P. Smith	6,839	Magnolia Pet	Winston Bros #2	Canyon, Per	59	9.9	6/64	6,862	Canyon, Pen
135	Scurry	8-10	210	97	H & T C	6,725	Bert Fields	Harmon #1	Canyon, Per	1,008	827.6	1/2	6,761	Canyon, Pen
136	Scurry	8-10	579	97	H & T C	8,230	Stanolind O & G	R.H. Jordan #1	Miss	47	63.5	Pump	8,922	Pre-Cambrian
137	Scurry	8-11	205	97	H & T C	6,761	Bert Fields	Eicke #1	Canyon, Per	975	867.8	1/2	6,791	Canyon, Pen
138	Scurry	8-19	160	3	H & G N	6,675	W.A. Moncrief et al	Buckalee #1	Canyon, Per	1,078	910.9	1/2	6,800	Canyon, Pen
139	Scurry	9-5	209	97	H & T C	6,716	G.P. Livermore	J.F. Woodson #1	Canyon, Per	433	407.9	5/8	6,756	Canyon, Pen
140	Scurry	9-7	190	97	H & T C	6,823	Burdell Oil	A.C. Martin #1	Canyon, Per	144	111.5	3/8	6,839	Canyon, Pen
141	Scurry	9-7	440	97	H & T C	6,256	Standard of Texas	J. Brown "2" #5	Canyon, Per	1,560	1,391.5	1/2	8,146	Ellenburger, Ord
142	Scurry	9-9	38	Tr. 30	Kirkland&Fields	6,793	G. Goffeetal	F.C. Chlenbusch #1	Canyon, Per	157	172.1	12/64	6,805	Canyon, Pen
143	Scurry	9-12	122	25	H & T C	6,636	T.W. Dussell et al	C.W. Addison #1	Canyon, Per	504	312.5	20/64	6,677	Canyon, Pen
144	Scurry	10-1	17	1	J.P. Smith	6,661	Sid-Fryer Drlg	E.S. Wilkinson #1	Canyon, Per	365	352.6	1/2	6,650	Canyon, Pen
145	Scurry	10-2	210	97	H & T C	6,729	King,Warren & Dye	L.L. Lewis #1	Canyon, Per	1,275	956.3	1/2	6,770	Canyon, Pen
146	Scurry	10-10	205	97	H & T C	6,760	Sun Oil	M. Lemens #1	Canyon, Per	341	349.4	1/4	6,799	Canyon, Pen
147	Scurry	10-15	183	97	H & T C	3,170	Ohiasotha O & G	L.M. Wilson #7	Clearfork, Per	74	5.6	Pump	3,225	Clearfork, Per
148	Scurry	10-15	26	1	J.P. Smith	7,494	Sunray Oil	L.S. Sentell #1	Strawn, Per	232	39.7	15/64	7,508	Strawn, Pen
149	Scurry	10-16	202	97	H & T C	6,611	Newman Bros Drlg	Eiland #1	Canyon, Per	379	397.7	5/32	6,769	Canyon, Pen
150	Scurry	10-23	209	97	H & T C	6,661	Lone Star	O.C. Beason #1	Canyon, Per	410	324.7	3/8	6,865	Canyon, Pen
151	Scurry	11-4	22	1	J.P. Smith	6,798	Pansey	L.S. Sentell #1	Canyon, Per	400	136.8		6,950	Canyon, Pen
152	Scurry	11-5	177	3	H & G N	6,779	L.M. Lockhart	D.M.Mahaney #1	Canyon, Per	602	541.8	3/8	6,890	Canyon, Pen
153	Scurry	11-10	200	97	H & T C	6,681	Cities Service	Johnson "B" #1	Canyon, Per	642	439.8	3/4	6,808	Canyon, Pen
154	Scurry	11-10	143	97	H & T C	3,004	D & R Oil	W.F. Burney #1	Clearfork, Per	61	8.5	Pump	8,238	Ellenburger, Ord
155	Scurry	11-13	246	97	H & T C	6,842	S.B. Roberts	Lewis #1	Canyon, Per	152	121.6	1/2	6,868	Canyon, Pen
156	Scurry	11-20	247	97	H & T C	6,685	Newman Bros	H. Toren #1	Canyon, Per	649	455.6	3/8	6,796	Canyon, Pen
157	Scurry	11-27	251	97	H & T C	6,580	N. B. Hunt	Cunored #1	Canyon, Per	486	483.0	1/4	6,550	Canyon, Pen
158	Scurry	11-28	16	1	J.P. Smith	6,662	Wm Hamm	J.A. Joyce #1	Canyon, Per	2,360	1,821.6	3/4	6,762	Canyon, Pen
159	Scurry	11-28	180	3	H & G N	6,730	Standard etal	J.R. York #1	Canyon, Per	276	193.2	22/64	6,768	Canyon, Pen
160	Scurry	12-2	88	97	H & T C	7,713	Placid Oil	R.H. Odem #1	Ellenburger, Ord	5		Pump	7,733	Ellenburger, Ord

TABLE 2 - CONTINUED SUCCESSFUL WILDCATS AND EXTENSIONS DRILLED IN WEST TEXAS

LINE NUMBER	COUNTY	1949 COMP. DATE	LOCATION			DEPTH TO TOP OF PAY FT.	COMPANY	LEASE AND WELL NO.	PRODUCING FORMATION	INITIAL PRODUCTION PER DAY		CHOKE FRACTIONS	TOTAL DEPTH FT.	DEEPEST HORIZON TESTED
			SEC.	BLK.	SUV.					OIL, U.S. BBL.	GAS, THOUSANDS CU. FT.			
161	Scurry	12-10	63	3	H & T C	7,310	R.W. Baxter etal	D.D. Feldman #1	Ellenburger, Ord	121	82.9		7,362	Ellenburger, Ord
162	Scurry	12-19	205	97	H & T C	7,643	Sun Oil	M. Lummus #2	Strawn, Pen.	110	86.9	1/4	7,680	Strawn, Pen
163	Sterling	6-13	81	5	H & T C	1,141	Placid & Ohio	L.T. Clark #3	San Andres, Per	17		Pump	1,400	Clearfork, Per
164	Sterling	7-27	6	A	B.B. Wade	868	York & Harper	L.C. Clark #1	San Andres, Per	14		Pump	1,030	San Andres, Per
165	Sutton	9-25	7	7	T W & N G	3,408	Shell Oil	S.B. Roberts #1	Strawn, Pen		148.0		4,653	Ellenburger, Ord
166	Terrell	9-27	29	161	G C & S F	5,250	Western Nat.Gas	O.J. Hoge #1	Wolfcamp, Per		627.0		5,910	Wolfcamp, Per
167	Terry	3-10	91	4-X	E L & R R	9,400	Seaboard Oil	P.M. Hinson #1	Canyon, Per	130	67.5		11,845	Ellenburger, Ord
168	Tom Green	2-8	193	D. 11	S P R R	4,730	Plymouth Oil	J.D. Robertson #1	Strawn, Pen	410	241.9	1/4	4,754	Strawn, Pen
169	Tom Green	3-18	193	D. 11	S P R R	4,740	Plymouth Oil	J.W. Green "IP #1	Strawn, Pen	240	97.4	1/4	5,657	Pre-Canirian
170	Tom Green	3-29	194	D. 11	S P R R	4,700	Plymouth Oil	J.D. Robertson #2A	Strawn, Pen	223	85.9	15/64	4,735	Strawn, Pen
171	Tom Green	5-10	195	D. 11	S P R R	4,676	J.K. Wadley	J.W. Green #1	Strawn, Pen	226	98.1	1/4	4,725	Strawn, Pen
172	Tom Green	6-5	193	D. 11	S P R R	4,210	Plymouth Oil	J.D. Robertson #3A	Canyon, Pen	67			4,756	Strawn, Pen
173	Tom Green	12-8	19	25	H & T C	4,835	Hiawatha O & G	W.G. Garrie #1	Strawn, Pen	112	91.3	1/4	4,881	Strawn, Pen
174	Upton	2-16	14	4-1/2	G C & S F	11,090	Slick-Urschel	H.F. Neal #1	Fusselman, Sil	594	4,900.5	3/8	11,564	Ellenburger, Ord
175	Upton	3-15	31	40-T-4-S	T & P	12,700	Magnolia Pet	T X L "A" #1	Ellenburger, Ord	975	1,402.1	1/2	13,295	Ellenburger, Ord
176	Upton	3-28	39	Y	T C R R	11,375	Humble O & R	R. Barnett #1-D	Fusselman, Sil	206	1,643.3	14/64	11,453	Simpson, Ord
177	Upton	6-11	3	Y	G C & S F	11,305	Republic Nat Gas	R. Barnett #1-E	Fusselman, Sil	223	1,837.1	3/4	11,385	Fusselman, Sil
178	Upton	10-21	44	40, T-4-S	T & P	12,960	Republic Nat Gas	V.J. Powell #1	Ellenburger, Ord	1,018	1,372.3	3/4	13,125	Ellenburger, Ord
179	Winkler	2-25	2	B-1	P S L	9,660	Gulf Oil	Keystone Cat Co #135-D	Dev	1,556	1,487.5	1/2	9,744	Dev
180	Winkler	11-21	24	A-57	P S L	9,605	Gulf Oil	Keystone Cat Co #146-D	Dev	209	178.9	1/4	11,877	Ellenburger, Ord

LINE NUMBER	COUNTY	LOCATION			TOTAL DEPTH, FT.	COMPANY	LEASE AND WELL NO.	DEEPEST HORIZON TESTED	DATE COMPLETED
		SEC.	BLK.	SUR.					
1	Andrews	20	A-37	P S L	8,829	Fullerton Oil	H.M. Wilson "B" #9	Dev (1)	1-6
2	Andrews	21	14	Univ Lds	10,000	Stanolind O & G	Univ of Texas "BC" #1	Dev (2)	1-12
3	Andrews	14	14	Univ Lds	9,000	Stanolind O & G	Univ of Texas "BI" #1	Cisco, Pen	1-30
4	Andrews	1	A-41	P S L	7,507	J.C. Barnes	Munger & Nix #1	Clearfork, Per	2-4
5	Andrews	14	9	Univ Lds	6,125	Frank & Geo. Frankel	Univ of Texas "104" #1	Holt, Per	2-6
6	Andrews	11	13	Univ Lds	9,535	Magnolia Pet	Univ of Texas #2	Dev	3-16
7	Andrews	31	1	Univ Lds	4,863	York & Harper, Inc	Phillips Univ of Texas #1	Grayburg, Per	3-21
8	Andrews	11	13	Univ Lds	8,445	So Minerals Corp	Univ "A" #1	Wolfcamp, Per	3-25
9	Andrews	27	12	Univ Lds	8,605	Champlin Refg	Univ of Texas "I" #1	Sil (3)	3-26
10	Andrews	12	13	Univ Lds	8,650	M.J. Delaney	Univ of Texas "A" #1	Wolfcamp, Per	3-31
11	Andrews	1	13	Univ Lds	8,651	M.J. Delaney	Univ of Texas "B" #1	Wolfcamp, Per	3-31
12	Andrews	15	1	Univ Lds	4,820	Amerada	Andrews-Univ "A" #1	Grayburg, Per	4-30
13	Andrews	22	A-47	P S L	9,860	J.C. Barnes	Paul Lawlis #1	Dev	5-24
14	Andrews	1	44, T-2-N	T & P	5,242	Forehall Oil	Emma Cowden #5	San Andres, Per	6-15
15	Andrews	38	7	Univ Lds	5,055	Anderson-Prichard	Univ of Texas "U" #1	San Andres, Per	6-27
16	Andrews	7	7	Univ Lds	5,886	Anderson-Prichard	Univ of Texas "E" #1	San Andres, Per	8-1
17	Andrews	22	A-42	P S L	7,395	Standard of Texas	Columbus Gray #1	Wichita Albany, Per	8-27
18	Andrews	5	42, T-2-N	G & MB & A	4,777	C.V. Bay etal	David Fasken "G" #1	Grayburg, Per	9-28
19	Andrews	20	A-51	P S L	12,396	Geo P.Livermore etal	A.L. Mayhew etal #1	Ellenburger, Ord	10-17
20	Andrews	27	A-44	P S L	4,956	Cascade Pet	J.E. Parker #1	San Andres, Per	11-12
21	Borden	22	31, T-6-N	T & P	8,231	H.L. Hunt	Clayton & Johnson "B" #1	Canyon Ls, Pen (4)	3-29
22	Borden	37	31, T-6-N	T & P	8,406	Seaboard O & G	Clayton & Johnson #1	Canyon Ls, Pen	6-17
23	Borden	418	97	H & T C	8,550	Ryan, Hayes & Burke	H.B. Herd #1	Ellenburger, Ord	7-23
24	Borden	47	32, T-4-N	T & P	8,210	Seaboard O & G	Clayton #1	Canyon Ls, Pen	7-24
25	Borden	44	32, T-6-N	T & P	10,070	Sinclair O & G	Rosa Pratt #1	Ellenburger, Ord	10-6
26	Borden	117	25	H & T C	8,435	Amerada Pet	J.R. Canning #1	Ellenburger, Ord	10-13
27	Borden	40	32, T-6-N	E L & R R	10,804	Sinclair O & G	W.H. Bryan #1	Granite, Pre-Cam	11-5
28	Borden	33	32, T-6-N	T & P	10,090	Sinclair O & G	Ruth Reynolds #1	Ellenburger, Ord	11-5
29	Borden	46	32, T-6-N	E L & R R	10,026	Sinclair O & G	T.P. Turner #1	Ellenburger, Ord	11-5
30	Borden	22	32, T-6-N	E L & R R	10,106	T.W. Boswell	R.H. Cantrill #1	Ellenburger, Ord	12-27
31	Borden	30	31, T-5-N	T & P	9,554	Dan Aneche etal	Clayton & Johnson #1	Ellenburger, Ord	12-28
32	Cochran	13	L	P S L	11,660	Stanolind O & G	C.L. Adams #1	Mis	3-25
33	Cochran	10	L30	Armstrong	5,100	Constantin	N. Black #1	San Andres, Per	7-10
34	Cochran	18	L35	Armstrong	10,788	Humble O & R	F.O. Masten #1	Granite, Pre-Cam	8-2
35	Coke	687		P. Maurer	6,998	Seaboard O & G	M. Russell #1	Ellenburger, Ord	2-4
36	Coke	308	1-A	H & T C	6,981	C.W. Sharp	Gartman #1	Ellenburger, Ord	2-15
37	Coke	231	2	H & T C	7,155	Plymouth Oil	Millican #1	Ellenburger, Ord	2-16
38	Coke	260		C.F. Otto	1,406	San Valley Oil	Rawlings #1	San Andres, Per	3-28
39	Coke	448	1-A	H & T C	6,180	Yarborough etal	A. Fletcher #1	Ellenburger, Ord	4-3
40	Coke	269	1-A	H & T C	7,061	Union Oil	J. Frost #1	Ellenburger, Ord	4-9
41	Coke	324	1-A	H & T C	6,943	Sun Oil	B. Hanks #1	Ellenburger, Ord	5-19
42	Coke	23		C. Rubio	6,362	So Minerals & Seaboard	Rawlings #1	Ellenburger, Ord	6-3
43	Coke	429	1-A	H & T C	5,716	J.K. Wadley	Gray #1	Ellenburger, Ord	6-12
44	Coke	Lot 2	43	Bronte Town	5,210	T.W. Murray etal	L.T. Youngblood #1	Strawn, Pen	6-27
45	Coke	383		Emil Hanke	5,406	Rice Bros, Inc	P.H. Stephenson #1	Ellenburger, Ord	8-22
46	Coke	302		Felix Sosa	6,374	Humble O & R	S. Odom #2	Granite, Pre-Cam	9-12
47	Coke	389		W. Thuren	5,408	Sauna Exp	W. Hall #1	Ellenburger, Ord	10-31
48	Coke	377	1-A	H & T C	6,729	C.H. Murphy	R.C. Russell	Ellenburger, Ord	12-20
49	Concho	18		R.H. Haskins	1,900	Nicholson & Jones	J. Rice #1	Canyon, Pen	4-15
50	Concho	356		G.F. Gould	3,306	J.R. Stewart	D. Barr #1	Ellenburger, Ord	10-9
51	Concho	11		T T R R	3,540	Stewart & Butler	D. Barr #1	Ellenburger, Ord	10-31
52	Concho	18	R	R.H. Haskins	2,000	Lamb & Ford Drlg	Rice #1	Canyon, Pen	11-25
53	Crane	27	X	C C S D & R G N G	3,248	Texas	R. King #1	San Andres, Per	1-19
54	Crane	3	X	C C S D & R G N G	2,853	G.F. Getty	Hallie Day #2	Grayburg, Per	2-14
55	Crane	210	F	C C S D & R G N G	3,327	Geo. Kidd	McClurtie Bros #1	San Andres, Per	2-16
56	Crane	5	B-23	P S L	10,190	Gulf Oil	M.F. Henderson #54-E	Ellenburger, Ord	2-27
57	Crane	58	X	C C S D & R G N G	11,032	Humble O & R	Jax Cowden etal #1	Ellenburger, Ord	3-26
58	Crane	18	6	H & T C	5,710	Gallery & Hurt etal	J.M. Moseley #1	Ellenburger, Ord	7-1
59	Crane	Tr 7		Williamson #10	6,539	Moore Exp	T.C. Barnaley #1	Dev	11-19
60	Crane	15	22	P S L	3,600	B.L. McFarland	W.E. Connell #1	San Andres, Per	11-23
61	Crockett	16	UV	G C & S F	1,455	C.F. Garlitz	Wenner-Shannon #1	San Andres, Per	1-18
62	Crockett	24	O	E L & R R	8,150	Amerada	Shannon Est "E" #1	Ellenburger, Ord	2-1
63	Crockett	27	UV	G C & S F	1,489	Geo. Bean	Geo. Bean #1	San Andres, Per	2-4
64	Crockett	5	O	C.W. Brown	11,865	Texas	Tom Smith #1	Ellenburger, Ord	2-21
65	Crockett	53	1	I & G N	2,108	Sun Oil	Halff-Bivins Est #1	San Andres, Per	3-8
66	Crockett	54	1	I & G N	2,291	Sun Oil	Halff-Bivins Est #2	San Andres, Per	4-5
67	Crockett	4	39	Univ Lands	8,500	C.U. Bay & Vickers Pet	Univ 1-39	Ellenburger, Ord	4-7
68	Crockett	12	30	Univ Lands	8,615	Frank & Geo. Frankel	Univ"503"#1	Ellenburger, Ord	4-17
69	Crockett	24	UV	Univ Lands	1,460	Oliver & Kotysa	Caruthers #1-A	San Andres, Per	5-3
70	Crockett	25	2	I & G N	2,078	T.W. & J.M. Loffland	L.B. Cox, Jr #1	Yates, Per	5-23
71	Crockett	4	NN	T & St L	1,602	H.P. Dunn	L.B. Hoover #1	San Andres, Per	6-5
72	Crockett	10	29	Univ Lands	8,626	H. Hunt Trust	Univ "L" #1	Ellenburger, Ord	6-15
73	Crockett	10	000	G C & S F	12,105	Texas	U.I. Pierce #2	Ellenburger, Ord	6-25
74	Crockett	28	UV	G C & S F	1,440	D.D. Thomas etal	Archie Bean #1	San Andres, Per	8-6
75	Crockett	61	UV	G C & S F	2,225	Gar-Ter Drlg	Sinclair-Andrews #1	San Andres, Per	8-22
76	Crockett	26	2	I & G N	1,134	A.W. Adkisson	L.B. Cox #1	San Andres, Per	9-7
77	Crockett	17	UV	G C & S F	1,500	D.W. Smith	J.M. Shannon #1	Leonard, Per	10-1
78	Crockett	64	1	I & G N	2,805	Moore Exp	Halff "A" #1-64	San Andres, Per	10-2
79	Crockett	11	4	Archer	6,825	John L. Moore	Shannon "K" #1	Ellenburger, Ord	10-15
80	Crockett	3	UV	G C & S F	1,509	J.W. Russell etal	J.M. Shannon #1	San Andres, Per	10-16
81	Crockett	40	BB	T C R R	9,222	Cities Service Oil	Shannon "B" #1	Ellenburger, Ord	11-9
82	Crockett	65	1	I & G N	4,053	Moore Exp	H.M. Halff #1-65	Clearfork, Per	11-12
83	Crockett	100	GH	G C & S F	9,500	Humble	Harvick #2	Ellenburger, Ord	11-22
84	Crockett	21	YZ	I & G N	8,010	Moore Exp	Shannon "I" #1	Ellenburger, Ord	11-27
85	Crockett		4	Chambers	1,520	Gar-Ter Drlg etal	Gulf-Chambers #1	San Andres, Per	11-29
86	Crockett	27	UV	G C & S F	1,450	D.D. Thomas etal	George Bean #1	San Andres, Per	12-1

TABLE 3 - CONTINUED UNSUCCESSFUL WILDCATS AND EXTENSIONS DRILLED IN WEST TEXAS

LINE NUMBER	COUNTY	LOCATION			TOTAL DEPTH, FT.	COMPANY	LEASE AND WELL NO.	DEEPEST HORIZON TESTED	DATE COMPLETED
		SEC.	BLK.	SUR.					
87	Crockett	88	GP	G C & S F	8,851	T. Weiner etal	I.B. Vaughn #1	Ellenburger, Ord	12-5
88	Crockett	15	ST	G C & S F	9,368	L.M. Glasco	Clara Couch #1	Ellenburger, Ord	12-17
89	Crockett	22	XX		1,227	H.L. Cain	Geo. Harrell #1	San Andres, Per	12-20
90	Culberson	17	52	P S L	2,260	Stephens Pet	Sherrod & Clare #1	Delaware, Per	3-8
91	Culberson	34	66,T-1-N	T & P	6,650	Pure Oil	E. Hunter #1	Ellenburger, Ord	5-11
92	Culberson	14	110	P S L	2,246	Tex-Ozona Prod	Phillips #1	Delaware Sd, Per	5-28
93	Culberson	16	111	P S L	2,118	Freeport Swl	A.V. Stein etal #1	Dleaware, Per	5-30
94	Culberson	14	62	P S L	534	Barrett & Russell	Nevill-Phillips #1	Castile, Per	6-4
95	Culberson	12	110	P S L	938	Mills-Lea	Fisher #5	Castile, Per	7-12
96	Culberson	7	111	P S L	890	Russell & Wadsworth	J.H. Fisher #1	Castile, Per	7-13
97	Culberson	22	114	P S L	1,844	R.H & A.L. Smithpeter	W.A. Scott etal #1	Delaware, Per	7-13
98	Culberson	23	114	P S L	1,935	R.H. & A.L. Smithpeter	W.A. Scott #2	Delaware, Per	11-25
99	Dawson	15	C-39	P S L	4,940	Lawson Drlg	Alma Gaines #1	San Andres, Per	9-2
100	Dawson	8	35,T-6-N	G B &	11,679	Seaboard Oil	Mart Barrow #1	Ellenburger, Ord	11-25
101	Dawson	12	3	Taylor	10,005	R.J. Carraway	T.A. Loe #1	Ellenburger, Ord	12-20
102	Dickens	177	1	H & G N	8,117	Union Oil	W.J. Elliott, Jr #1	Pre-Cam, Ord	12-12
103	Ector	15	45,T-2-S	T & P	6,369	J.C. Barnes	Buchanan #1	Clearfork, Per	6-15
104	Ector	31	44,T-1-N	T & P	8,289	T.P. Coal & Oil	C. Scharbauer "I" #33	Dev (5)	7-17
105	Ector	40	43,T-2-S	T & P	13,588	Stanolind O & G	E.F. Cowden "D" #2	Ellenburger, Ord(6)	9-25
106	Ector	22	42,T-1-S	T & P	4,971	E. Ewing etal	A. Barrow #1	Grayburg, Per	9-27
107	Ector	19	42,T-3-S	T & P	4,817	Aldrich & Fullingham	T.P. Land & Tr "A" #1	Grayburg, Per	12-6
108	Gaines	41	R	D & W	5,200	Anderson-Prichard Oil	G.D. Boldin #1	San Andres, Per	1-3
109	Gaines	10	H	D & W	3,640	Duncan & Robertson	Jones #1	San Andres, Per	1-5
110	Gaines	17	C-33	P S L	5,770	C.H. Osmond	W.T. Morris etal #1	San Andres, Per	1-30
111	Gaines	2	C-31	P S L	4,977	Cabot Carbon	S.E.W. Bice #1	San Andres, Per	3-7
112	Gaines	32	AX	P S L	11,419	Argo Oil	E.H. Jones "C" #1	Dev	3-23
113	Gaines	16	273	Loving	13,271	Magnolia Pet	W.C. Hicks #1	Ellenburger, Ord	3-24
114	Gaines	31	AX	P S L	11,380	Argo Oil	E.H. Jones "B" #1	Dev	4-24
115	Gaines	16	C-44	P S L	5,450	C.H. Murphy	E.T.O'Daniel #1	San Andres, Per	5-1
116	Gaines	12	292	Lynn	13,791	Seaboard Oil	M.S. Doss #1	Ellenburger, Ord	6-4
117	Gaines	315	G	C C S D & R G N G	11,620	Pacific Western Oil	Oil Devel Co of Texas #1	Dev	6-10
118	Gaines	5	H	D & W	13,186	Stanolind O & G	Amer Warehouse #15	Ellenburger, Ord	6-10
119	Gaines	356	G	C C S D & R G N G	5,186	Paul F. Puttledge	A. Banton #1	San Andres, Per	8-23
120	Gaines	2	C-31	P S L	4,959	Cabot Carbon etal	S.E.W. Bice	San Andres, Per	10-5
121	Gaines	360	G	C C S D & R G N G	10,890	Los Nietos & Honolulu	M.S. Doss "B" #2	Dev (7)	12-30
122	Gaines	25	A-9	P S L	6,555	Amerada Pet	W.M. Breckon #1	Clearfork, Per	12-27
123	Gaines	16	283	Schleicher	5,350	Lawson & Chiles	Woolsey & Davies #1	San Andres, Per	12-28
124	Garza	1,305		B S & F	3,685	Geo.H. Brown	W.J. Long #1	Clearfork, Per	1-18
125	Garza	8	2	T & N O	8,462	Plymouth Oil	L.B. Sims #1	Ellenburger, Ord	4-16
126	Garza	41	6	H & G N	2,617	P.W. Anderson etal	R.C. Miller "A" #1	San Andres, Per	9-6
127	Garza	5	5	Aycock	8,509	Comanche Corp	Montgomery-Davies "A" #1	Ellenburger, Ord(8)	10-16
128	Garza	42	6	H & G N	2,555	B.S. Anderson	L.A. Nance #1	San Andres, Per	10-17
129	Garza	1,225		E L & R R	3,750	Comanche Corp	Williams #2	Clearfork, Per	10-22
130	Garza	2	5	G H & H	8,290	Seaboard & Republic	O.S. Ranch #1	Ellenburger, Ord	10-31
131	Garza	1,235	280	A B & M	3,530	S.G. Dunn etal	Hammonds #1	San Andres, Per	11-20
132	Glasscock	13	36,T-2-S	T & P	4,111	Southern Minerals	S.C. Houston #1	San Andres, Per	6-13
133	Glasscock	3	32,T-4-S	T & P	9,920	Shell Oil	T X L #1	Ellenburger, Ord	10-29
134	Hale	18	K	T T R R	5,463	General Amer Oil	Bob Mayo #1	Pen	2-21
135	Hale	10	A-3	E L & R R	8,200	Cooper-Hemphill	Nick Alley #1	Pen	3-8
136	Hale	17	K	T T R R	6,050	General Amer Oil	A.F. Byrd #4	Pen	3-8
137	Hale	20	K	T T R R	6,047	General Amer Oil	F. Featherstone #1	Pen	3-9
138	Hale	17	K	T T R R	5,310	General Amer Oil	A.F. Byrd #5	Pen	6-15
139	Hale	7	O	D & S E	7,009	Tobe Foster etal	G.A. Harral #1	Pen	11-2
140	Hockley	4	A	P S L	6,214	E. Constantin etal	J.H. Goodpasture #1	Clearfork, Per	7-14
141	Hockley	26	A	H.M. Thompson	7,512	Woolley Pet	W.L. Elwood Est #1	Clearfork, Per	7-30
142	Howard	107	29	W & N W	2,830	Ray Albaugh	Stewart #1	San Andres, Per	1-1
143	Howard	2	33,T-2-S	T & P	3,343	C.A. Jones	L.W. Longshore #1	San Andres, Per	1-25
144	Howard	38	32,T-1-N	T & P	8,330	Sun Oil	Cowden Oil Co #1	Wolfcamp, Per	4-27
145	Howard	48	32,T-2-N	T & P	8,321	C.L. Norsworthy	Mary T. Christian #1	Wolfcamp, Per	8-15
146	Howard	36	33,T-3-N	T & P	8,421	Moore Exp	Mildred Jones #1	Canyon, Pen	12-23
147	Irion	2	43	Univ	9,500	Shell Oil	Owens-Univ #1	Ellenburger, Ord	2-1
148	Irion	19		G C & S F	7,830	F. & G. Frankel	Tankersley Est #2	Ellenburger, Ord	5-1
149	Irion	191	1	T & P	10,144	Humble O & R	Sawyer Cattle Co "F" #1	Ellenburger, Ord	5-9
150	Irion	1,227		G C & S F	1,503	Higgins & Cowan	Murphey #1	San Andres, Per	7-5
151	Irion	4		Gonzales	525	Davenport Oil	J.M. Nutt #1	Cre	7-25
152	Irion	5		Gonzales	610	Sloan-Wells	J.M. Nutt #1	Cre	7-25
153	Irion	5		Gonzales	1,612	C.M. Page	J.M. Nutt #1	Glorietta, Per	11-25
154	Irion	49	10	S P R R	6,783	Moore Exp	Abe Mayer #1	Pen	12-17
155	Irion	37		W C R R	8,916	Morgan-Aikman	Sol Mayer #1	Ellenburger, Ord	12-20
156	Kent	7	B	P S L	6,997	L.H. Wentz	L.B. Fuqua #1	Strawn, Pen	1-9
157	Kent	57	98	T C R R	7,135	M.E. Davis	Bert Wallace #1	Ellenburger, Ord	5-8
158	Kent	39	2	H & G N	7,835	Ohio Oil	J.J. Emery Est #1	Ellenburger, Ord	6-22
159	Kimble	14		H & B	2,593	M.C. Moore etal	R.S. Siekev #1	Ellenburger, Ord	1-1
160	Kimble	10		W.A. Choice	2,492	J.B. Stewart	M.S. Crawford #1	Ellenburger, Ord	5-7
161	Kimble	7	4	T W & N G	2,561	J.B. Benfro	M.B. Murr #1	Ellenburger, Ord	5-31
162	Kimble	47	4	T W & N G	2,878	V.J. Meyer	Geo. Dutton #1	Strawn, Pen	6-18
163	Kimble	751		Kimble	2,356	G.W. Strake	Roy Spiller #1	Ellenburger, Ord	9-6
164	King	119	A	J.B. Rector	5,380	Humble O & R	Bateman Tr #46	Pen	1-31
165	King	13		San Lazrus	5,232	6666 Oil	S.B. Burnett #5	Canyon, Pen	7-16
166	King	51		F.P. Knott	4,439	Ard Drlg etal	R.B. Masterson #1	Cisco, Pen	12-19
167	Lamb	22	674	A.B. Taylor	4,172	DeKalb Agr Assoc	J.R. Jameson #1	San Andres, Per	2-14
168	Lamb	5	213	Deaf Smith	8,135	Pacific Western	D.L. Breen #1-B	Wolfcamp, Per	5-1
169	Loving	47	56,T-1	T & P	3,442	Hill & Hill	T X L #1	Delaware Sd, Per	4-10
170	Loving	48	56,T-1	T & P	3,775	Davis & McDaniel	Schaee "C" #1	Delaware Sd, Per	6-20
171	Lubbock	25	D-7	P L & R R	11,450	Phillips Pet	Kary #1	Pre-Cam, Ord	2-15
172	Lubbock	35	D-7	E L & R R	3,615	Amerada Pet	C.D. Bradford #1	San Andres, Per	6-13

LINE NUMBER	COUNTY	LOCATION SEC.	BLK.	SUR.	TOTAL DEPTH, FT.	COMPANY	LEASE AND WELL NO.	DEEPEST HORIZON TESTED	DATE COMPLETED
173	Lynn	58	1	Georgetown	11,295	McAlester Fuel & Honolulu	C.O. Edwards #1	Ellenburger, Ord	2-24
174	Lynn	47	8	E L & R R	10,777	Sinclair-Prairie Oil	Geo.C. Lindley #1	Ellenburger, Ord	6-24
175	Lynn	2	8	E L & R R	10,556	Barnsdall Oil	Billie Williams #1	Ellenburger, Ord	8-20
176	Lynn	14	0	H & O B	5,215	Chiles & Lawson	G.C. McPherson #1	San Andres, Per	12-5
177	McCulloch	9		I R R	3,101	McDaniel & Beecherl	O.E. Helge #1	x	2-2
178	McCulloch			J. Herck #911	2,942	Happal, Richter & Co	O.V. Scroggins #1	Ellenburger, Ord	2-9
179	McCulloch	126			1,862	M.L. Happal	C.B. Kvzar #1	Pre-Cam, Ord	3-11
180	McCulloch			Beason #594	417	H.H. Sides	Gomila etal #1	(Shut Down)	10-15
181	McCulloch			Hartung #839	762	E.E. Thate	R.E. Cooper #1	Canyon, Pen	11-4
182	McCulloch			Dehring A-1,084	600	Westbrook etal	Hughes #1	Cisco, Pen	11-16
183	Menard	28		A-1,702	3,559	United No & So Dev	W.J. Wilkinson #1	Ellenburger, Ord	8-16
184	Midland	36	39, T-3-S	T & P	13,822	Gulf Oil	W. Bryant #1-E	Ellenburger, Ord	3-2
185	Midland	46	37, T-2-S	L. Leech	8,522	Magnolia Pet	Mary Turner #1	Strawberry, Per	6-6
186	Midland	25	39, T-3-S	T & P	4,445	York & Harper	T & P Land Tr #1	San Andres, Per	7-19
187	Mitchell	79	97	H & T C	3,143	Lynch Oil	Coleman Est #1	Clearfork, Per	2-7
188	Mitchell	84	26	T & P	7,361	Flour Bluff etal	L.S. Garvin #1	Ellenburger, Ord	2-21
189	Mitchell	39	12	H & T C	7,675	Richardson & Bass	J.H. Nail Est "39" #1	Ellenburger, Ord	3-4
190	Mitchell	9	27	T & P	2,185	Union Drlg	L. Hamilton "A" #1	San Andres, Per	3-15
191	Mitchell	17	13	J.P. Smith	7,622	Hurlbut & Olson	W.L. Ellwood #1	Ellenburger, Ord	5-1
192	Mitchell	12	25	T & P	7,565	Capital	Mary Ebie #1	Ellenburger, Ord	6-19
193	Mitchell	2	26	H & T C	8,108	Humble O & R	F.B. Crabtree #1	Ellenburger, Ord	8-24
194	Mitchell	12	25	T & P	7,273	Capital	M. Ebie "41" #1	Ellenburger, Ord	10-14
195	Mitchell	81	27	T & P	7,445	Shamrock & Seaboard	Powell #1	Clearfork, Per	11-7
196	Mitchell	4	26	T & P	7,669	L. Hunt Tr Est	C.F. Feaster #1	Ellenburger, Ord	12-20
197	Motley	128	M	Matador	8,616	Humble O & R	Matador Ld & Cat Co #1	Can	2-28
198	Pecos	42	10	H & G N	2,028	Condor Pet	State-Vaughn #1	Grayburg, Per	1-15
199	Pecos	24	10	H & G N	1,615	Dick Deen	Kinney "A" #1	Yates, Per	1-19
200	Pecos	50	10	H & G N	1,599	J.O. Griffith	W.H. Henderson #1	Yates, Per	1-19
201	Pecos	27	10	H & G N	1,477	Lassiter Drlg	Iowa Realty Trust #1	Yates, Per	1-21
202	Pecos	110	3	T & P	3,220	W.L. Goldston	I.G. Prince #1	Queens, Per	1-25
203	Pecos	41	10	H & G N	2,669	Hal C. Peck	W.T. Shearer #1	Grayburg, Per	2-1
204	Pecos	39	3	H & T C	9,526	Magnolia Pet	Eaton "39" #1	Ellenburger, Ord	2-14
205	Pecos	118	11	H & G N	1,707	H.O. Pool	Ruth Steves #1	San Andres, Per	2-17
206	Pecos	19	19	Univ Lds	2,442	Thomas & Sons	University #1	Grayburg, Per	3-9
207	Pecos		104	Jasper	3,030	Basin Oil	Jasper C S L #1	San Andres, Per	3-11
208	Pecos	18	140	T & St L	1,704	C.S. Messinger	Rooney Est #1	Grayburg, Per	3-15
209	Pecos	31	10	H & G N	1,606	Cannon Drlg	Iowa Realty Tr #1	Yates, Per	3-16
210	Pecos	25	8	H & G N	6,028	M.E. Davis	C.E. Blackman #1	San Andres, Per	3-18
211	Pecos	9	Z	T C R R	2,031	Hancock & Phillips -	Lowery & Wilson #1	Grayburg, Per	3-25
212	Pecos	50	10	H & G N	1,542	J.O. Griffith	R.H. Cummins #1	Yates, Per	4-1
213	Pecos	50	10	H & G N	1,541	C.F. Ketchum	R.H. Cummins #1	Yates, Per	4-1
214	Pecos	17	140	T & St L	6,860	Standard of Texas	St Nat'l Bk of El Paso #1	Ellenburger, Ord	4-3
215	Pecos	15	Z	T C R R	1,570	Helmerich & Payne	Lowery & Wilson "E" #1	Grayburg, Per	4-11
216	Pecos	39	12	H & G N	5,318	Shell Oil	J.A. McDonald #1	Ellenburger, Ord	4-13
217	Pecos	3	C	G C & S F	2,459	Hunt Oil	Elsinore Ranch Co #1	x	4-27
218	Pecos	33	Z	T C R R	1,809	M.R. McManigle	Lowery & Wilson #1	Grayburg, Per	4-29
219	Pecos	1	194	G C & S F	1,431	Jessie Russell	Helmerich & Payne #1	Grayburg, Per	5-2
220	Pecos	2	9	H & G N	2,120	Dalport Oil	Scharff & Blackman #1	Yates, Per	5-7
221	Pecos	101	8	H & G N	2,013	Dalport Oil	Cords & Juul #1	Yates, Per	5-10
222	Pecos		3	Runnels	602	Gulf Oil	I.G. Yates #96-To	Toborg	5-16
223	Pecos	10	Z	T C R R	1,970	Anderson & Ward	Lowery & Wilson #1	Grayburg, Per	6-1
224	Pecos	1	9	H & G N	1,115	Danvers & Wheeler	Improve Dist #2	x	6-1
225	Pecos	9	3	H & T C	2,353	Richardson & Bass	W.K. Heagy #1	San Andres, Per	6-3
226	Pecos	2	9	H & G N	1,950	Dalport Oil	Scharff & Blackman #2	Yates, Per	6-12
227	Pecos	1	D	G C & S F	1,920	Hunt Oil	Elsinore Roy Co #7	x	6-18
228	Pecos	1	C	G C & S F	2,057	Hunt Oil	Elsinore Roy Co #2	x	11-7
229	Pecos	18	C	G C & S F	1,263	Hunt Oil	Elsinore Roy Co #4	x	6-29
230	Pecos	10	D	G C & S F	1,520	Hunt Oil	Elsinore Roy Co #6	x	6-29
231	Pecos	39	16	Univ Lds	1,703	C.U. Bay	University "C" #1	San Andres, Per	7-6
232	Pecos	40	1	I & G N	671	Figo Pet	M. Monroe #1	Salado, Per	7-6
233	Pecos	29	10	H & G N	1,397	Dick Deen	Iowa Realty Tr #1	Yates, Per	7-12
234	Pecos	69	10	H & G N	5,355	Ted Weiner etal	Iowa Realty Tr #1-E	Ellenburger, Ord	7-16
235	Pecos	33	C	G C & S F	1,330	Hunt Oil	Elsinore Roy Co #5	x	7-21
236	Pecos	107	3	T & P	3,504	Permian Drlg	D. Puckett #1	Yates, Per	8-8
237	Pecos	90	8	H & G N	11,601	Hiawatha O & G	J.C. Trees Est #1	Ellenburger, Ord	8-26
238	Pecos			#2, J.C. Duval	5,656	Humble O & R	San Pedro Ranch #1	Ellenburger, Ord	8-27
239	Pecos			#539, Arnold & Barnett	1,267	Helmerich & Payne	F.E. Toborg #27	Grayburg, Per	8-29
240	Pecos	56	10	H & G N	1,497	Culbertson & Irwin	J.W. Breen "A" #1	Yates, Per	9-4
241	Pecos	31	C	G C & S F	1,340	Hunt Oil	Elsinore Roy Co #6	x	9-8
242	Pecos	592	A 5262	G C & S F	1,309	Union Oil	J.R. Bennett "C" #1	Yates, Per	9-20
243	Pecos	58	1	I & G N	348	Richardson & Jones	Cliett-Yates #1	x	10-1
244	Pecos	11	26	Univ Lds	5,669	Los Nietos	University "B" #1	Pre-Cam, Ord	10-7
245	Pecos	3	3	H & T C	6,337	C.H. Murphy	M.E. Ford #1	Ellenburger, Ord	10-7
246	Pecos	66	10	H & G N	1,650	M.D. O'Quinn	J.L. McMurtry #1	Yates, Per	10-10
247	Pecos	38	D	G C & S F	1,569	Hunt Oil	Elsinore Roy Co #16	x	10-11
248	Pecos	41	D	G C & S F	1,120	Hunt Oil	Elsinore Roy Co #15	x	10-12
249	Pecos	42	10	H & G N	1,963	Meriwether & Saver	Vaugh #1	Queen, Per	10-12
250	Pecos	23	16	Univ Lds	2,025	Helmerich & Payne	University "U" #1	San Andres, Per	10-19
251	Pecos	593	103	G C & S F	1,375	Dick Deen	C.S. Messinger #1	Yates, Per	10-21
252	Pecos	30	16	Univ Lds	1,685	Ramon Develop	University #1	Grayburg, Per	11-7
253	Pecos	31	178	T C R R	2,370	Heard & Pepper	K.C. & Ft Stockton L&C #1	Yates, Per	11-13
254	Pecos	25	10	H & G N	1,685	C.F. Messinger	Unsicker #1	Yates, Per	11-18
255	Pecos	53	10	H & G N	1,480	E.C. Hubble	Iowa Realty Tr #1	Yates, Per	11-21
256	Pecos	18	Z	T C R R	1,910	L.E. Edwards etal	G.H. White #1	San Andres, Per	11-23
257	Pecos	24	178	T C R R	2,129	Capetco	Hinde Heirs etal	Grayburg, Per	11-26
258	Pecos	20	C	G C & S F	1,751	Hunt Oil	Elsinore Roy Co #3	x	11-28

TABLE 3 - CONTINUED UNSUCCESSFUL WILDCATS AND EXTENSIONS DRILLED IN WEST TEXAS

LINE NUMBER	COUNTY	LOCATION SEC.	BLK.	SUR.	TOTAL DEPTH, FT.	COMPANY	LEASE AND WELL NO.	DEEPEST HORIZON TESTED	DATE COMPLETED
259	Pecos	33	C	G C & S F	1,330	Hunt Oil	Elsinore Roy Co #5	x	7-25
260	Pecos	58	16	H & G N	1,458	A.G. Slocum etal	J.Gl Crockett #1	Yates, Per	12-1
261	Reagan	70	2	T & P	6,490	British Amer O.P.	S.A. Hull #1	Leonard, Per	1-5
262	Reagan	142	1	T & P	10,917	Humble O & R	Sawyer Cat Co "E" #1	Ellenburger, Ord	1-24
263	Reagan	18	48	Univ Lds	10,019	Atlantic Refg	Univ 48 "A" #1	Ellenburger, Ord	2-27
264	Reagan	15	12	Univ Lds	2,625	Plymouth Oil	Tex Univ #1-15	San Andres, Per	3-16
265	Reagan	20	11	Univ Lds	10,516	Superior & Atlantic	University #1-11-A	Ellenburger, Ord	4-3
266	Reagan	226	1	T & P	9,799	Stanolind & Darciger	E.P. Miller #1	Ellenburger, Ord	5-31
267	Reagan	18	48	Univ Lds	2,395	Ratliff & Bourg	Univ-Atlantic "A" #1	San Andres, Per	9-11
268	Reagan	104	2	T & P	10,170	York & Harper	J.D. Sugg Est #1	Ellenburger, Ord	12-11
269	Reeves	11	56	H & G N	3,326	Combined Oil	Blankenship #1	Delaware Sd, Per	1-19
270	Reeves	2	C-20	P S L	3,726	May & Finch	O.L. Smith #1	Delaware, Per	3-20
271	Reeves	16	56	P S L	4,560	Texaxma Prod	Hickey & Reeves #1	Delaware, Per	5-31
272	Reeves	11	2	H & G N	3,979	Bay Pool etal	A.S. Chapman #1	Delaware, Per	9-28
273	Runnels	48		G.W. Dyer	3,960	La Gloria	Cox-Fowler #1	Strawn, Pen	1-21
274	Runnels			J.H. Havens	3,570	E.S. Price Oils	Lenora Fowler #1	Strawn, Pen	2-19
275	Runnels			Bay L & C Co	4,050	M.J. Florence	E.W. Gray #2	Strawn, Pen	3-3
276	Runnels			G.W. Dyer	3,978	E.P. Griffin	Henry Fowler #1	Strawn, Pen	3-5
277	Runnels			J.H. Parramore #110	3,760	O.P. Leonard	A.V. Livingston #4	Bend, Pen	3-23
278	Runnels	Tr 40		M.P. Parramore #26	2,387	M.J. Florence	E.W. Gray #4	Cisco, Pen	4-2
279	Runnels			C. Hoff #118	4,917	Slick Oil	G.A. Gully #1	Hickory Sd, Can	4-8
280	Runnels			J. Hughes #227	3,550	H. Easterwood	H. Giesecke #3	Strawn, Pen	4-15
281	Runnels	Tr 14		A. Lozoya #515	4,444	F.S. Cochran	Masterson #1	Ellenburger, Ord	5-14
282	Runnels			M.P. Parramore	2,342	Al P. Groebl	J.C. Beddo #2-B	Cisco, Pen	5-30
283	Runnels			P. Walker #146	4,632	Geochemical Sur	A. Schwerter #1	Bend, Pen	6-1
284	Runnels			E. Lassiter #174	4,115	British Amer O.P	E.C. Pape #1	Bend, Pen	6-2
285	Runnels	SD 51		D. Diaz #532	3,921	Al P. Groebl	J.C. Beddo #2-A	Strawn, Pen	6-30
286	Runnels			H.H. Howard #6	4,263	Geochemical Sur	C.R. Roesller #1	Bend, Pen	7-1
287	Runnels			J. Hays #530	4,602	Texas Union Oil	H. Campbell #1	Ellenburger, Ord	7-12
288	Runnels			R.A. Smith #2	4,125	Burt & Woods Drlg	W. Wilson #1	Ellenburger, Ord	8-10
289	Runnels			T.R. Webb #357	4,254	Geochemical Sur	J.W. Freeman #1	Bend, Pen	8-12
290	Runnels			A. Evans #274	5,330	Sells Pet	J. Stubblefield #1	Ellenburger, Ord	9-4
291	Runnels	Tr 39	39	M.P. Parramore	2,375	M.J. Florence	E.W. Gray #3	Cisco, Pen	9-21
292	Runnels	58	63	A.C. Kelsey	4,927	Robinson-Puckett, Inc	H.M. Roberts #1	Ellenburger, Ord	10-1
293	Runnels	73	63	C T R R	3,511	Spiller & Crawford	A.C. & L.Ernst #1	Canyon, Pen	10-1
294	Runnels			W.M. Baggs #326	4,610	Delaware Drillers, Inc	Ben Nitsch #1	Bend, Pen	10-10
295	Runnels			C.D. Frann #42	3,069	Saxon Exp	Trimmier #1	Canyon, Pen	10-17
296	Runnels			Bay L & C Co	3,922	Gillespie & Sons	J.N. Wilkie #1	Strawn, Pen	10-21
297	Runnels	83		J. Hensley	3,068	G.W. Strake	J.D. Smith, Jr #1	Cisco, Pen	10-21
298	Runnels	53		H & T B	4,334	Robinson & Puckett, Inc	W. Roberts #1	Strawn, Pen	10-22
299	Runnels			J.C. McKeen #534	4,738	Woods Drlg	D.J. Goertz #1	Bend, Pen	10-22
300	Runnels	147	42	E T R R	2,374	Con Oil	Cox #1	Cisco, Pen	10-25
301	Runnels			J. Nalls #378	4,891	Delaware Drillers, Inc	V. Dankworth #1	Hickory Sd, Can	11-19
302	Runnels			Burnett #271	4,017	Sells Pet	W.F. Wilde #1	Canyon, Pen	11-19
303	Runnels			J. Hensley #83	2,863	G.W. Strake	B.A. Jacob #7	Cisco, Pen	11-25
304	Runnels	53		H T & B	4,914	Robinson & Puckett, Inc	T.E. Chapmond #1	Ellenburger, Ord	11-26
305	Runnels	113		D. Letsch	4,762	N.R. Hunt	G.A. Gully #1	Ellenburger, Ord	11-30
306	Runnels			J.C. McKeen #534	2,375	E.K. & E. M. Burt	C. Adami #1	Cisco, Pen	12-6
307	Runnels			J.C. McKeen #534	2,393	E.K. & E.M. Burt	Dick Kruse #1	Cisco, Pen	12-15
308	Runnels			J.G. Wagner #424	4,367	A.G. Hill	C.E. Dankworth #1	Ellenburger, Ord	12-15
309	Runnels			J. Early #449	5,532	G.W. Strake	E.M. Cathey #1	Ellenburger, Ord	12-15
310	Runnels			J.H. Perry #346	4,958	Humble O & R	Norton Properties #1	Ellenburger, Ord	12-26
311	Runnels			Hensley #83	5,191	G.W. Strake	Smith #2	Ellenburger, Ord	7-1
312	Schleicher	23	L	G H & S A	5,683	Lario O & G	T.R. Henderson "B" #1	Strawn, Pen	1-29
313	Schleicher	12	L	G H & S A	5,744	Cole-Darden	McFurnett #1	Strawn, Pen	2-11
314	Schleicher	10	A	H E & W T	7,025	Sorrels etal	Tisdale #1	Ellenburger, Ord	2-17
315	Schleicher	15	M	G H & S A	6,940	La Gloria	B.B. Ewing #1	Ellenburger, Ord	3-7
316	Schleicher	4	M	G H & S A	6,000	A.P. Groebl etal	W. Lovelace #1	Strawn, Pen	7-18
317	Schleicher	2	8	T W & N G	5,020	Southern Minerals	J.F. Webster #1	Ellenburger, Ord	7-27
318	Schleicher	8	V-28	B.A. Brantley	6,252	Morris & Scherck	T.R. Henderson #1	Ellenburger, Ord	8-4
319	Schleicher	37	L	G H & S A	5,850	Morgan-Aikman	Jess Koy #4-E	Strawn, Pen	8-7
320	Schleicher	69	M	G H & S A	6,570	Lone Star Prod	C. Pinson #1	Ellenburger, Ord	8-26
321	Schleicher	16	A	H E & W T	6,012	L.W. Elliott	V.G. Tisdale #1	Ellenburger, Ord	9-9
322	Schleicher	94		A B & M	4,980	Parker & McGaw	B.M. Boyd #1	Ellenburger, Ord	9-23
323	Schleicher	7	M	G H & S A	5,810	Ohio Oil	A.L. Baugh #1-B	Strawn, Pen	9-23
324	Schleicher	16	A	H E & W T	3,008	L.W. Elliott, Tr	V.G. Tisdale #2	Wolfcamp, Per	10-20
325	Schleicher	74	LL	G C & S F	6,969	Honolulu Oil	W. Tisdale #1	Ellenburger, Ord	11-4
326	Scurry	636	97	H & T C	7,524	Sun & Ohio	S. Helms #1	Granite, Can	1-19
327	Scurry	171	97	H & T C	2,300	W.S. Guthrie	B. Longbottom #1	San Andres, Per	3-2
328	Scurry	115	97	H & T C	8,090	Fullerton Oil	W.A. Reiter #1	Ellenburger, Ord	4-9
329	Scurry	437	97	H & T C	7,305	Humble O & R	L. Edmondson "B" #1	Canyon, Pen	4-26
330	Scurry	451	97	H & T C	8,397	Lone Star Prod	M.M. Maule #1	Ellenburger, Ord	5-1
331	Scurry	437	97	H & T C	8,405	Humble O & R	L. Edmondson #1	Ellenburger, Ord	5-2
332	Scurry	453	97	H & T C	476	Jordan Drlg	B.A. Moore #1	Cretaceous	6-9
333	Scurry	256	97	H & T C	7,638	C.L. Norsworthy	E.R. Williamson #1	Strawn, Pen	6-17
334	Scurry	Lot 58	38	Kirkland & Fields	7,978	W.A. Moncrief etal	D. Moore #1	Ellenburger, Ord	6-20
335	Scurry	440	97	H & T C	8,146	Standard of Texas	J. Brown "2" #5	Ellenburger, Ord (9)	9-7
336	Scurry	159	97	H & T C	7,627	Bay Harris Drlg	A.C. Martin #1-A	Strawn, Pen	10-1
337	Scurry	503	97	H & T C	7,518	Progress Pet	E.S. Carden #1	Strawn, Pen	10-16
338	Scurry	10	1	J.P. Smith	7,415	Bert Fields	H.W. Winston #1	Canyon, Pen	11-1
339	Scurry	159	97	H & T C	8,111	Bay Harris Drlg	Smith #1	Ellenburger, Ord	11-3
340	Scurry	157	3	H & G N	8,177	Olson Drlg	J.B. Green #1	Ellenburger, Ord	11-8
341	Scurry	548	97	H & T C	8,340	Stanolind O & G	J.B. Whatley #1	Ellenburger, Ord	11-15
342	Scurry	307	97	H & T C	7,905	Placid Oil	T.C. Davis #1	Ellenburger, Ord	11-20
343	Scurry	143	97	H & T C	8,238	D & R Oil	W.F. Barney #17	Ellenburger, Ord (10)	11-10
344	Scurry	37	1	Kirkland & Fields	7,905	Magnolia	Winston Bros #1	Ellenburger, Ord (11)	2-15

LINE NUMBER	COUNTY	LOCATION			TOTAL DEPTH, FT.	COMPANY	LEASE AND WELL NO	DEEPEST HORIZON TESTED	DATE COMPLETED
		SEC.	BLK.	SUR.					
345	Scurry	579	97	H & T C	8,922	Superior & Inten	B.H. Jordan #1	Granite, Can (12)	8-10
346	Scurry	165	97	H & T C	7,693	F.M. Manning	B.S. Burrows #1	Canyon, Pen	12-29
347	Scurry	442	97	H & T C	7,500	J.L. Collins	G.E. Parks #2	Strawn, Pen	6-28
348	Sterling	10	13	S P R R	5,317	Yarbrough & Son	R.W. Foster #1	Wolfcamp, Per	2-21
349	Sterling	77	18	S P R R	8,137	Brewster & Bartle	J.L. Ellwood #1	Mis	4-11
350	Sterling	10	13	S P R R	5,688	Pan American etal	Ellwood "P" #1	Wolfcamp, Per	7-1
351	Sterling	55	18	S P R R	8,218	Humble O & R	L. Foster #1	Ellenburger, Ord	8-8
352	Sterling	27	11	S P R R	1,364	Daniel & Kenley	Luckie #1	San Andres, Per	8-20
353	Sutton	36	A	G W T & P R R	4,673	C.H. Murphy	J.I. King #1	Ellenburger, Ord	1-22
354	Sutton	24	K	G H & S A	5,250	Transwestern Roy	S. E. McKnight #1	Ellenburger, Ord	5-18
355	Sutton	78	9	T W & N G	6,620	Theck & Cross Drlg	J.M. Vanderstricker #1	Ellenburger, Ord	9-26
356	Sutton	62	7	T W & N G	4,311	E.C. Lawson	J.C. Mitchell #1	Ellenburger, Ord	11-7
357	Terrell	24	128	T & St L	12,074	Humble O & R	L.B. Barksdale #1	Pen	1-30
358	Terrell	50	A-2	G H & S A	2,989	R.E. Freeman	N.A. Lindsey #1	Pen	5-3
359	Terry	11	C-36	P S L	5,135	Union Oil	C. Golden #1	San Andres, Per	8-2
360	Terry	7	C-37	P S L	5,005	Anderson-Prichard	A.M. Bromfield #1	San Andres, Per	10-26
361	Terry	26	A-1	E L & R R	10,364	Amerada Pet	Turner etal #1	Pen	12-27
362	Tom Green	250		B. Schmidt	1,195	Turner & Myers	Linthicum #1	San Andres, Per	1-2
363	Tom Green	1		A B & S	6,581	J.J. Perkins etal	L.T. Clark #1	Ellenburger, Ord	1-3
364	Tom Green	12		T C R R	1,215	Placid Oil & Ohio	Wilde etal #1	San Angelo, Per	1-29
365	Tom Green	53	Dist 11	S P R R	6,244	J.M. West	E. Harrington #1	Can	2-5
366	Tom Green	1,829		L. Straus	6,668	American Republics	L.T. Clark #2	Ellenburger, Ord	3-7
367	Tom Green	2		H E & W T	1,135	Placid Oil & Ohio	J.W. Green "P" #1	San Andres, Per	3-12
368	Tom Green	193	Dist 11	S P R R	5,657	Plymouth Oil	W.B. Pullian #1	Pre-Can (13)	3-18
369	Tom Green			Wells #8	6,100	Sun Oil	W.C. Jones Est #1	Strawn, Pen	3-26
370	Tom Green	190	Dist 11	S P R R	6,149	Hiawatha O & G	W.C. Waddell #1	Can	7-18
371	Tom Green	68	5	H & T C	1,348	C.W. Strake	E.C. Rawlings #1	Clearfork, Per	7-22
372	Tom Green	85	5	H & T C	1,500	Shackelford & Moore	F.J. Holik #1	Clearfork, Per	8-23
373	Tom Green	154	Dist 11	S P R R	5,330	La Gloria Oil	T.L. Wood #1	Ellenburger, Ord	9-5
374	Tom Green	133	Dist 11	S P R R	5,775	J.R. Stewart	Jeff Scherz #1	Ellenburger, Ord	11-1
375	Tom Green			W. Scherz #1	6,524	White & Hughes	J.E. Melde #1	Ellenburger, Ord	11-22
376	Tom Green			P. Keasler #1,642	4,705	H.G. Spiller	Harris Est "A" #1	Ellenburger, Ord	12-4
377	Tom Green	75	6	H & T C	1,872	Parker Pet	J.W. Johnson #1	San Andres, Per	12-27
378	Tom Green			A.H. Neill #173-3/4	5,812	Stanolind O & G	J.D. Robertson #3-A	Ellenburger, Ord	12-31
379	Tom Green	193	Dist 11	S P R R	4,756	Plymouth	McElroy Ranch Co #1	Strawn, Pen	6-5
380	Upton	148	E	C C S D & P G N G	8,040	Standard of Texas	H. Neal #1	Wolfcamp, Per	2-1
381	Upton	6	A	E L & R R	2,025	D. Elder	H.F. Neal #1	Castile, Per	3-29
382	Upton	26	D		6,719	Samedan Oil	Phillips Univ #1	Leonard, Per	5-5
383	Upton	20	14	Univ Lds	1,569	P. Rankin	McElroy #42	Grayburg, Per	6-21
384	Upton	135	E	C C S D & R G N G	9,562	Wilshire Oil	J.W. Robbins #2	Wolfcamp, Per	9-1
385	Upton	4	W	G C & S F	9,267	Superior Oil	Yarbrough & Allen #7	Ellenburger, Ord	12-20
386	Ward	17	13	P S L	11,230	Humble O & R	J.D. Campbell #1	Ellenburger, Ord	1-8
387	Ward	23	1	W & N W	5,068	Anderson Prichard	S.F. Hoyzlett #1	Delaware, Per	3-5
388	Ward	17	5	H & T C	9,255	Barnes & Hall	J. Wallace #1	Ellenburger, Ord	6-15
389	Winkler	88	1	P S L	11,855	Richardson & Bass	Keystone Cat Co #146-D	Ellenburger, Ord	9-10
390	Winkler	24	A-57	P S L	11,877	Gulf Oil	M. West #1	Ellenburger, Ord (15)	11-21
391	Yoakum	606	D	J.H. Gibson	5,375	Duncan Drlg	J.C. Sartin #1-A	San Andres, Per	3-10
392	Yoakum	19	C-34	P S L	7,213	Republic Nat'l Gas	C. L. Adams #1	San Angelo, Per	3-22
393	Yoakum	13	L	P S L	11,660	Stanolind O & G	C.A. Elliott "A" #5	Mis	3-25
394	Yoakum	832	D	J.H. Gibson	11,210	Fikes & Murchison	G.E. Turrentine #1	Per-Cambrian (16)	4-11
395	Yoakum	41	K	P S L	7,920	Amerada Pet	B. Clay #1	Clearfork, Per	6-30
396	Yoakum	12	D	J.H. Gibson	5,336	Cabot Carbon		San Andres, Per	11-2

Oil And Gas Developments In New Mexico During 1949

By JOHN M. KELLY, * Member AIME and EDWARD E. KINNEY, ** Associate Member AIME

The petroleum industry of New Mexico continued to operate at a brisk pace during the year 1949. Crude oil production expanded to 47,634,539 bbl which production advanced New Mexico to seventh place among the oil producing states. Gas production continued to expand under the stimulus of an urgent demand.

Drilling activity contracted a little over 13 per cent in 1949. There were 565 well completions of which 354 were oil wells, 74 were gas wells, and 137 were dry holes. There were 541 new wells drilled and 24 old wells drilled deeper. Ninety-two of the wells were wildcats which resulted in 2 gas pools, 11 oil pools, and 79 dry holes for a discovery rate of 1 to 6. The year's exploration opened 15 new oil pools and 2 new gas pools. In addition there were 31 pool extensions.

North Lea County was the scene of seven new discoveries ranging in depth from Permo-Pennsylvanian to Devonian. Southeast of Hobbs near the state line an important Drinkard horizon was discovered.

In the San Juan Basin the most important discovery was commercial oil in the Dakota on the eastern side at Lindrith some 90 miles east of the Rattlesnake Pool. At year's end this well had not been fully completed. In addition gas was discovered about 8 miles north-northwest of Aztec and also on the eastern edge of the Basin at Gavilan.

A good show of gas in the Apache well in Northern Chaves County drew attention to the area where Chaves, De Baca, and Roosevelt Counties meet.

Leasing activity continued brisk but was mainly confined to adding to blocks and to acquiring small protective holdings.

Geophysical work was very active in the San Juan Basin and in Northern Eddy and Lea Counties and in adjacent counties to the north.

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NEW DISCOVERIES AND IMPORTANT WILDCATS

LEA COUNTY

BAGLEY SILURO-DEVONIAN POOL: Amerada Pet. Corp. No. 1 State B1A in Sec. 2, T12S, R33E, was completed at a producing depth of 10,950 ft in Siluro-Devonian dolomite for an initial production of 1,744 B/D.

BAGLEY PENNSYLVANIAN POOL: Amerada Pet. Corp. No. 1 Caudle in Sec. 10, T12S, R33E, was completed at a producing depth of 9,001 ft in Pennsylvanian lime for an initial production of 285 B/D.

BOUGH POOL: Magnolia Pet. Co. No. 1 Betenbough in Sec. 12, 19S, R35E, was completed at a producing depth of 9,617 ft in Permo-Pennsylvanian lime for an initial production of 511 B/D.

CROSSROADS PENNSYLVANIAN POOL: Magnolia Pet. Co. No. 1 Santa Fe Pacific RR "B" in Sec. 28, T9S, R36E, was completed at a producing depth of 9,750 ft in Pennsylvanian lime for an initial production of 175 B/D.

DENTON POOL: McAlester Fuel Co. No. 1 Denton in Sec. 11, T15S, R37E, was completed at a producing depth of 11,325 ft in Devonian dolomite for an initial production of 457 B/D.

FOWLER POOL: Stanolind Oil & Gas Co. No. 1 So. Mattix Unit in Sec. 15, T24S, R37E, was completed at a producing depth of 9,505 ft in Ellenburger dolomite for an initial production of 383 B/D.

HIGHTOWER POOL: Amerada Pet. Corp. No. 1 State B1B in Sec. 26, T12S, R33E, was completed at a producing depth of 10,155 ft in Devonian dolomite for an initial production of 971 B/D.

HOUSE POOL: Stanolind Oil & Gas Co. No. 1 State U in Sec. 2, T20S, R38E, was completed at a producing depth of 6,190 ft in the Drinkard zone of the Yeso formation for an initial production of 41 B/D.

KNOWLES POOL: Amerada Pet. Corp. No. 1 Hamilton in Sec. 35, T16S, R38E, was completed at a producing depth of 12,446 ft in Devonian dolomite for an initial production of 935 B/D.

RIO ARRIBA COUNTY

GAVILAN POOL: Gardner Petroleum Co. No. 1 Dunham in Sec. 14, T25N, R2W, was completed at a producing depth of 3,416 ft in Pictured Cliffs sand for an initial production of 277 Mcf of gas per day after shoo.

LINDRITH POOL: Delhi Oil Co. No. 1 Ingwerson-Federal in Sec. 20, T24N, R2W, encountered commercial oil in Dakota sand at a total depth of 7,802 ft. At year's end the well was not fully completed.

Denman Drilling Company's No. 1 Gardner-Federal in Sec. 23, T26N, R2W, and No. 2 Kates-Federal in Sec. 32, T26N, R2W, were drilled into the Pictured Cliffs sand of the Mesaverde group at a total depth of 4,189 ft and 4,000 ft respectively. The No. 1 Gardner tested 1 BOPD of 42° gravity after shot and the No. 2 Kates tested 50 Mcf gas plus 1 bbl oil of 42° gravity per day after shot. These two wells together with the Gavilan Pool discovery indicate the possibility of commercial oil and gas in the Pictured Cliffs formation on the eastern edge of the San Juan Basin.

SAN JUAN COUNTY

LA PLATA POOL: Southern Union Production Co. No. 1 Richardson-Federal in Sec. 10, T31N, R12W, was completed in the Point Lookout sand of the Mesaverde group at a producing depth of 5,040 ft for an initial production of 4,500 Mcf of gas per day.

FUTURE ACTIVITY

The San Juan Basin will see an accelerated rate of development in 1950. There will be an important increase in the number of gas field wells drilled and in the number of wildcats on the eastern slope in Rio Arriba County.

The Northern Lea County area will see extensive development of the new discoveries. Wildcatting will hammer at the lock on the Chaves, Roosevelt County Area.

Much interest will be centered on the drilling in Eddy County west of the Pecos River where several deep wells are drilling or projected.

Leasing and especially geophysical work will continue strong throughout New Mexico.

TABLE I - OIL AND GAS PRODUCTION STATISTICS FOR NEW MEXICO IN 1949

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[d] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	THOUSAND BBL TO END OF 1949	THOUSAND BBL DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
	SOUTHEASTERN NEW MEXICO											
1	Aid, *Eddy*	Yates-7 Rivers, Per	1941	200	21	2						
2	Anderson, *Eddy*	Grayburg-San Andres, Per	1940	1,800	854	57				126		
3	Arrowhead, *Lea*	Grayburg, Per	1938	5,120	15,808	1,275		41,727	6,293	4,582		
4	Artesia, *Eddy*	Grayburg-San Andres, Per	1923	9,720	5,532	297						
5	Bagley-Pen, *Lea*	Pen	1949	80	11	11		16	16	1,486		
6	Bagley-Sil/Dev, *Lea*	Siluro-Devonian	1949	160	54	54		2	2	28		
7	Baish, *Lea*	Yates, Per	1935	240	335	9						
8	Barber, *Eddy*	Yates, Per	1937	560	525	33						
9	Benson, *Eddy*	Yates, Per	1943	200	174	6						
10	Black River, *Eddy*	Delaware, Per	1937	200	9	5						
11	Blinebry, *Lea*	Yeso, Per	1945	560	121	46		1,109	411	1,859		
12	Bough, *Lea*	Penn-Pen	1949	80	59	59			112	1,896		
13	Bowers, *Lea*	7 Rivers, Per	1946	3,320	1,398	465		1,991	811	1,744		
14	Brunson, *Lea*	Ellenburger, Ord	1945	3,200	7,397	3,016		10,482	25,500			
15	Cajrock, *Chaves & Lea*	Queen, Per	1940	5,240	2,836	823			67	87		
16	Cary, *Lea*	Montoya, Ord	1948	80	66	49		81	67	1,352		
17	Caso, *Lea*	Pen	1944	160	498	146		111	23			
18	Cooper-Jal, *Lea*	Yates-7 Rivers, Per	1929	8,800	26,710	795		179,369	6,182	2,035		
19	Corbin, *Lea*	Queen, Per	1938	120	68	2						
20	Crossroads, *Lea*	Siluro-Devonian	1948	200	243	198			8	42		
21	Crossroads-Pen, *Lea*	Pen	1949	40	12	12			16	1,332		
22	Crossroads-Slaughter, *Lea*	San Andres, Per	1948	40	1	1				994		
23	Culwin, *Eddy*	Queen, Per	1942	40	12							
24	Daugherty, *Eddy*	San Andres, Per	1938	120	23	2						
25	Dayton, *Eddy*	Grayburg, Per	1940	720	137	6				16		
26	Denton, *Lea*	Devonian	1949	80	23	23			14	1,440		
27	Drinkard, *Lea*	Yeso, Per	1944	14,640	17,122	6,728		31,857	21,402	3,068		
28	Drinkard, North, *Lea*	Yeso, Per	1948	240	26	26			324	1,337		
29	Drinkard, South, *Lea*	Yeso, Per	1948	120	9	5		17	13	2,400		
30	Dublin-Devonian, *Lea*	Devonian	1949	40	1	1						
31	Eaves, *Lea*	Yates-7 Rivers, Per	1928	1,240	4,705	376		36,035	494	598		
32	Elliott, *Lea*	Abo, Per	1949	40	6	6						
33	Empire, *Eddy*	Yates-7 Rivers, Per	1924	2,720	449	3						
34	Eunice-Monument, *Lea*	7 Rivers-San Andres, Per	1929	40,360	196,018	10,906		692,709	57,236	4,670		
35	Eunice, South, *Lea*	7 Rivers, Per	1930	4,480	10,439	573		113,239	23,500	32,893		
36	Fenton, *Eddy*	Delaware, Per	1943	40	1							
37	Forrest, *Eddy*	San Andres, Per	1945	600	231	80						
38	Fowler, *Lea*	Ellenburger, Ord	1949	40	38	38			39	1,032		
39	Fren, *Eddy*	7 Rivers, Per	1929	2,440	1,435	225				241		
40	Garrett, *Lea*	San Andres, Per	1947	40	6	2			3	1,602		
41	Getty, *Eddy*	Yates, Per	1927	400	1,050	68						
42	Grayburg-Jackson, *Eddy*	Queen-San Andres, Per	1939	13,720	23,769	1,751				1,212		
43	Grayburg-Keely, *Eddy*	San Andres, Per	1948	160	55	33				308		
44	Halfway, *Lea*	Yates, Per	1939	360	636	32						
45	Hardy, *Lea*	Queen-Grayburg, Per	1937	1,560	2,110	66		8,796	799	12,014		
46	Hare, *Lea*	Simpson, Ord	1947	640	538	348		689	477	1,372		
47	Hare, South, *Lea*	Simpson, Ord	1947	120	116	51		128	60	1,177		
48	Harrison, *Lea*	Yeso, Per	1945	40	10							
49	Henshaw, *Eddy*	San Andres, Per	1930	80	8							
50	High Lonesome, *Eddy*	Queen, Per	1939	380	36	5						
51	High Lonesome, South, *Eddy*	Grayburg, Per	1945	160	12							
52	Hightower, *Lea*	Devonian	1949	40	25	25			13	529		
53	Hobbs, *Lea*	San Andres, Per	1928	10,400	127,324	3,738			5,751	1,484		
54	House, *Lea*	Yeso, Per	1949	90	9	9			11	1,236		
55	Justis, *Lea*	Yeso, Per	1944				120	2,349	498			
56	Knowles, *Lea*	Devonian	1949	120	106	106			18			
57	Landlie-Mattix, *Lea*	Yates-Queen, Per	1929	17,080	24,720	1,136		341,942	39,248	18,591		
58	Leo, *Eddy*	Grayburg, Per	1939	280	163	11						
59	Leonard, *Lea*	7-Rivers, Per	1948	80	11	6						
60	Loco Hills, *Eddy*	Grayburg, San Andres, Per	1939	9,080	12,710	629				963		
61	Loco Hills-Queen, *Eddy*	Queen, Per	1949	10	2	2						
62	Lovington, *Lea*	San Andres, Per	1939	2,280	5,669	487		7,411	765	1,535		
63	Lovington, West, *Lea*	San Andres, Per	1944	2,280	3,185	738			976	1,322		
64	Lusk, *Eddy & Lea*	Yates, Per	1942	200	141	12						
65	Lusk, West, *Eddy*	Yates, Per	1944	80	5							
66	Lynch, *Lea*	Yates, Per	1929	520	7,728	111						
67	Lynch, North, *Lea*	Yates, Per	1929	40	134	5				64		
68	Maljamar, *Eddy & Lea*	Grayburg, San Andres, Per	1928	11,600	19,380	2,033		27,807	1,908			
69	Maljamar, East, *Lea*	Grayburg, San Andres, Per	1949	40	3	3						
70	Maljamar, North, *Lea*	Grayburg, Per	1939	200	109	20						
71	Maljamar, South, *Lea*	Grayburg, Per	1943	80	39	3			1	323		
72	McCormack, *Lea*	Silurian	1947	80	83	14		433	323	9,460		
73	McMillan, *Eddy*	7-Rivers- Queen, Per	1938	120	1	1						
74	Monument-Abo, *Lea*	Abo, Per	1948	120	43	41		168	161	3,909		
75	Monument-Blinebry, *Lea*	Yeso, Per	1948	80	66	42		47	31	743		
76	Monument-McKee, *Lea*	Simpson, Ord	1948	40	13	13		269	264	20,938		
77	Monument-Paddock, *Lea*	Yeso, Per	1948	160	132	69		235	131	1,901		
78	Nichols, *Eddy*	San Andres, Per	1948	200	47	40				236		
79	Paddock, *Lea*	Yeso, Per	1945	4,120	5,165	1,563		8,400	4,082	2,612		

LINE NUMBER	NUMBER OF WELLS[d]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB PER SQ INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.[k]	PROD. THICKNESS AVG. FT./NET	STRUCTURE[m]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
1	5	0	0	0	4	0				40		S		2,800		M C		
2	45	2	0	13	18	0				36		S D		2,500		M C	San Andres, Per	3,634
3	136	1	5	93	26	2	1,460			34		S D	Cav	3,540	80	A	San Andres, Per	4,350
4	141	19	13	24	157	2				35		S D		1,825		M C	San Andres, Per	3,383
5	2	2	0	1	1	0				45		D		9,001		A	Granite	11,766
6	4	4	0	4	0	0				46		D		10,965		A	Granite	11,766
7	6	0	0	0	3	0	1,700			41		S		2,400		M C	Pen	13,998
8	14	0	0	0	8	0	550			21		S		1,410		A	7-Rivers, Per	1,860
9	11	0	0	0	3	0				26		S		1,725		M C	San Andres, Per	2,988
10	8	1	0	0	3	0				39		S		1,940		M C	Delaware Per	2,320
11	14	2	0	10	2	6				41		D		5,575		A	Ellen., Ord	6,316
12	2	2	0	2	0	0				68		D		9,617		A	Pen	9,641
13	84	7	1	51	31	0				42		D		3,000		A	Abo, Per	8,010
14	81	13	0	72	7	0				42		D		7,700		A	Granite	8,370
15	136	5	2	1	126	0				38		S		3,025		M C	San Andres, Per	4,705
16	2	1	0	2	0	0	1,779			40		D		7,190		A	Ord	8,086
17	6	0	0	3	1	0	3,146			40		D		7,665		N L	Granite	10,464
18	288	15	11	36	71	36	1,400			29		S D	Cav	2,930		A	Yeso, Per	7,171
19	4	0	0	0	1	0				35		S		4,225		M C	Greyburg, Per	5,118
20	5	4	1	4	0	0	4,885			43		D		12,106		A F	Devonian	12,258
21	1	1	0	0	1	0				47		D		9,750		M C	Devonian	
22	1	0	0	0	1	0						D		4,831			San Andres, Per	4,881
23	2			Shut In						33		S		3,573		M C	Queen, Per	3,573
24	5	0	0	0	2	0				29		D		2,014		M C	San Andres, Per	3,010
25	21	2	3	2	9	0				36		S D		985		M C	San Andres, Per	2,545
26	2	2	0	2	0	0				43		D		11,375		A	Devonian	
27	385	53	6	332	24	8	2,660			40		D		6,790		A	Granite	8,370
28	7	6	1	6	0	0				38		D		6,625		A		
29	4	2	2	0	2	0	2,380			39		D		6,420		A		
30	1	1	0	1	0	0				36		D		9,410		A	Devonian	
31	34	1	0	11	17	2	1,300			29		S D		2,940		A	7-Rivers, Per	3,305
32	1	1	0	1	0	0						D		7,412		A	Granite	9,954
33	93	12	10	0	60	0				35		S D		350		M L	San Andres, Per	2,612
34	1212	3	21	739	702	16	1,450			32		S D		3,675		A	Ellen., Ord	9,953
35	139	12	0	89	12	21	1,440			32		D		3,605		A	Yeso, Per	6,202
36	5	0	0	Shut In						40		S		2,649		A	Delaware, Per	3,525
37	18	3	0	16	0	0				34		D		2,632		M C	San Andres, Per	3,200
38	1	1	0	1	0	0				44		D		1,600		A		
39	77	8	1	12	64	0				35		D		1,880		M C	Abo, Per	6,854
40	1	0	0	0	1	0				29		D		5,690		A	Glorieta, Per	5,760
41	10	0	0	0	8	0				22		S		1,325		A	Hone Springs, Per	6,683
42	144	20	1	185	144	0			P	36		S D		2,330		M C	Pen	6,896
43	4	0	0	2	2	0				39		D		3,294		M C	Pen	
44	13	0	0	0	4	0				26		S		2,486		A	Queen, Per	4,013
45	40	1	1	17	16	0				35		S D		3,630		S	San Andres, Per	3,875
46	16	11	0	15	1	0	3,033			40		S		7,920		A	Granite	8,231
47	3	0	0	1	2	0				40		S		7,400		A		
48	1	0	1	P & A	June 1949					34		D		5,015		A	Yeso, Per	5,075
49	2	0	0	0	1	0				36		D		3,135		M C	San Andres, Per	3,830
50	7	0	0	0	4	0				35		S		1,760		M C	San Andres, Per	3,130
51	4	0	1	0	P & A							S D		2,100		M C	San Andres, Per	3,385
52	1	1	0	1	0	0						D		10,155		A	Granite	11,191
53	283	4	5	205	51	0				34		D		3,950		A	Ellen., Ord	8,010
54	2	2	1	0	1	0				39		D		7,025		M C	Devonian	8,159
55	4	0	1	0	0	3						D						
56	3	3	0	3	0	0				47		D		12,570		A	Devonian	12,656
57	526	71	12	389	82	114	1,450		P	35		S D		2,870		A	Ord	11,014
58	12	0	0	2	5	0				36		S D		3,000		M C	San Andres, Per	3,653
59	3	0	0	2	0	0				40		D		3,400		A	Ellen., Ord	11,969
60	279	11	6	44	168	1	1,000		P	36		S D		2,430		M C	San Andres, Per	3,653
61	1	1	0	0	1	0						D		2,200		M C		
62	62	1	0	5	48	1	1,732			33		D		4,595		A	San Andres, Per	5,302
63	59	3	0	13	44	0	1,800			36		D		4,700		A	San Andres, Per	5,178
64	9	0	0	0	4	0				25		S		2,450		M C	7-Rivers, Per	2,710
65	4	0	0	0	1	0				27		S		2,290		M C	7-Rivers, Per	2,811
66	18	0	0	0	9	0				31		S		3,715		A	San Andres, Per	5,095
67	1	0	0	0	1	0				30		S		3,530		M C	7-Rivers, Per	3,633
68	305	7	0	186	74	1			P	39		S D		3,520		M C	Pen	13,998
69	1	1		0	1	0				36		S D		4,340		M C		
70	5	0	0	3	0	0				35		S D		3,690		M C		
71	2	0	0	0	1	0				32		S D		4,640		M C	San Andres, Per	4,840
72	2	0	0	2	0	0				44		D		7,200		A	Devonian	8,318
73	3	2	0	1	0	0				29		S		845		M C		
74	4	3	1	3	0	0				4		L		[illegible]		A	Ord	10,255
75	2	0	0	2	0	0				39		D		5,660		A	Ord	
76	1	0	0	1	0	0				47		S		9,890		A	Ord	
77	4	0	0	4	0	0				40		D		5,189		A	Ord	
78	8	3	1	5	0	0				36		D		2,945		M C	San Andres, Per	3,049
79	106	8	3	75	26	0	2,130			37		D		5,180		A	Ord	7,236

TABLE I – CONTINUED OIL AND GAS PRODUCTION STATISTICS FOR NEW MEXICO

LINE NUMBER	FIELD (County)[a]	PRODUCING FORMATION NAME AND AGE[b]	YEAR OF DISCOVERY	OIL PRODUCTION			GAS PRODUCTION			GAS/OIL RATIO[c] MCF/BBL	CONDENSATE PRODUCTION Thousands of Bbl	
				AREA PROVED ACRES	THOUSAND BBL TO END OF 1949	THOUSAND BBL DURING 1949	AREA PROVED ACRES	MILLION CU FT[c] TO END OF 1949	MILLION CU FT[c] DURING 1949		TO END OF 1949	DURING 1949
80	P. C. A., *Eddy*	Yates, Per	1939	400	481	22						
81	Pearsall, *Lea*	Queen, Per	1940	640	625	55						
82	Penrose-Skelly, *Lea*	Queen-Grayburg, Per	1936	14,800	18,790	508		106,274	5,574	10,533		
83	Premier, *Eddy*	Grayburg, Per	1929	2,120	2,433	127				49		
84	Red Lake, *Eddy*	Grayburg-San Andres, Per	1924	4,080	1,764	267			90	21		
85	Rhodes, *Lea*	Yates-7 Rivers, Per	1927	2,320	3,781	241		106,090	1,037	3,346		
86	Roberts, *Lea*	Grayburg, Per	1943	1,280	671	144			62	433		
87	Robinson, *Eddy & Lea*	Grayburg, San Andres, Per	1927	760	630	32				1,516		
88	Russell, *Eddy*	Yates, Per	1942	640	674	68						
89	San Simon, *Lea*	Yates, Per	1943	80	55	7			1	152		
90	Sawyer, *Lea*	San Andres, Per	1947	80	10	7			3	460		
91	Shugart, *Lea*	Yates-Queen, Per	1937	640	631	44						
92	Shugart, North, *Lea*	Queen, Per	1948	1,440	1,031	132				69		
93	Skaggs, *Lea*	Grayburg, Per	1937	160	286	20			35	1,775		
94	Square Lake, *Eddy*	Grayburg-San Andres, Per	1941	9,160	5,939	392						
95	Teague, *Lea*	Simpson, Ord	1948	280	308	232		230	172	744		
96	Tonto, *Lea*	7-Rivers, Per	1944	40	68	1			2	1,336		
97	Turkey Track, *Eddy*	Queen-Grayburg, Per	1943	440	104	15						
98	Turkey Track-7 Rivers, *Eddy*	7-Rivers, Per	1949	120	6	6						
99	Vacuum, *Lea*	Greenhorn-San Andres, Per	1929	16,160	48,125	4,442		49,037	5,217	1,174		
100	Warren-Wilkes, *Lea*	Simpson, Ord	1948	80	89	86		59	57	658		
101	Watkins, *Lea*	7-Rivers, Per	1945	80	11	4						
102	Watkins-Grayburg, *Lea*	Grayburg, Per	1947	40	18	10						
103	Weir, *Lea*	Yeso, Per	1947	80	48	8			50	6,283		
104	Wilson, *Lea*	Yates-7 Rivers, Per	1928	1,920	3,526	594			113	191		
105	Wilson, West, *Lea*	7-Rivers, Per	1948	240	73	70			1	16		
106	Young, *Lea*	Queen, Per	1945	280	191	50						
	NORTHERN NEW MEXICO											
1	Angels Peak, *San Juan*		1947	40	7	3	40	202	115			
2	Barker Creek Dome, *San Juan*		1941				1,600	8,619	1,236			
3	Barker Creek Dome, *San Juan*		1945				3,200	11,925	3,972			
4	Blanco, *San Juan*		1927				40	781	82			
5	Bloomfield, *San Juan*		1924	100	35	1						
6	Buyeros (Da), *Harding*		1916					419	87			
7	Cavilan, *Rio Arriba*		1949									
8	Hogback, *San Juan*		1922	160	2,688	74						
9	Hospah, *McKinley*		1927	960	2,523	203						
10	Rattz Canyon-Fulcher Basin, *San Juan*		1927				25,000	45,513	6,087			
11	La Plata, *San Juan*		1949				480	68	68			
12	Oswell, *San Juan*		1931	40	33							
13	Rattlesnake, *San Juan*		1934	740	4,450	27						
14	Rattlesnake, *San Juan*		1939		490							
15	Red Mountain, *McKinley*		1934	40	16							
16	Table Mesa, *San Juan*		1925	160	881	29						
17	Ute Dome, *San Juan*		1921				320	12,413	415			
18	Wyper, *San Juan*		1946	40	7	2						
				245,840	630,264	47,548	30,800	1,849,049	202,827			

LINE NUMBER	NUMBER OF WELLS[c]			WELLS PRODUCING[f] DEC. 1949			RESERVOIR PRESSURE LB. PER SQ. INCH		SECONDARY RECOVERY[g]	CHARACTER OF OIL[h]		PRODUCING FORMATION					DEEPEST ZONE TESTED[n] TO END OF 1949	
	COMPLETED TO END 1949	1949		OIL		GAS	INITIAL	AVG./END 1949		GRAVITY A.P.I.	SULPHUR PER CENT	CHARACTER[i]	POROSITY PER CENT[j]	DEPTH TO TOP OF PRODUCING ZONE FT.	PROD. THICKNESS AVG. FT. - NET	STRUCTURE[k]	NAME	DEPTH OF HOLE, FT.
		COMPLETED	ABANDONED	FLOWING	ARTIFICIAL LIFT													
80	12	0	0	0	8	0				23	S			1,485		A	7-Rivers, Per	1,956
81	20	1	0	5	11	0				37	S			3,320		M C	Glorieta, Per	5,150
82	390	2	2	125	179	1	1,420			36	S D			3,435		M C	Ellen., Ord	8,370
83	63	0	3	13	37					36	S D			3,090		M C	San Andres, Per	3,543
84	140	9	0	29	81	5				29	S D			1,710		M C	San Andres, Per	3,700
85	84	0	4	37	6	14	1,397			36	S			3,040		T	7-Rivers, Per	3,542
86	37	5	0	22	10	0				34	S D			4,000		M C	San Andres, Per	4,660
87	23	1	0	2	12	0				35	S D			3,530		M C	San Andres, Per	4,483
88	65	0	0	0	44	0				38	S			770		A	San Andres, Per	2,300
89	4	0	0	0	2	0				34	S			3,935		As	Yates, Per	4,183
90	4	2	1	1	1	0				25	D			5,000			San Andres, Per	5,011
91	14	0	0	1	10	0				38	S			2,656		A	San Andres, Per	4,890
92	43	3	1	0	25	0				33	S			3,100		M C	San Andres, Per	
93	6	1	0	3	1	0				36	S D			3,700		M C	Granite	10,465
94	242	2	10	108	85	0	950			39	S D			2,685		M C	Abo, Per	6,578
95	7	4	0	6	1	0	3,677			41	S			9,300		A	Granite	10,218
96	3	0	0	0	1	0				35	D			3,365		M C	7-Rivers, Per	
97	13	2	2	5	6	0				36	S D			2,060		M C	Grayburg, Per	3,896
98	3	3	0	3	0	0				35	D			1,655		M C	Grayburg, Per	3,896
99	421	6	0	171	225	0	1,660			35	S D			4,090		A	San Andres, Per	5,329
100	2	1	0	2	0	0					S			8,965		A	Ord	9,070
101	4	1	1	0	2	0				25	D			6,200		T	San Andres, Per	4,266
102	1	0	0	0	1	0					S D			4,217		T		
103	2	1	1	1	0	0				38	D			6,740		M C	Granite	10,435
104	61	4	3	23	22	0	1,325			31	S D			3,660		A	San Andres, Per	4,695
105	6	5	0	0	6	0				38	D			3,948		A	7-Rivers, Per	
106	8	1	0	0	7	0				37	S			3,765		M C	Queen, Per	3,783
1	1	0	0	1	0	0	1,840			40	S			6,490			Dakota, Cre U	
2	12	0	x	0	0	12	557				S			2,196			Pen	9,466
3	5	0	x	0	0	4	2,915				L			8,420			Pen	9,466
4	x	0	0	0	0	1					S			4,550			Mesaverde Cre U	
5	67	0	0	0	9	0				37	S			645		M C	Lewis Shale, Cre U	2,665
6		0	x	0	0	4					G W			2,000		M L	Granite Wash	2,000
7	1	1	0	Shut In		1					S			3,416		M C	Pictured Cliffs, Cre	
8	17	0	1	0	6	0	560			40	S			633			McElmo, Cre U	1,965
9	62	0	0	0	43	0				31	S			1,500		M C	Dakota, Cre U	3,282
10	133	16	0	0	0	93	560				S			1,467		M C	Dakota, Cre U	6,485
11	3	3	0	0	0	3					S			5,040		M C	Mesaverde, Cre U	
12	10	0	x	0	1	0					S			1,342		M C	Farmington, Cre U	
13	130	0	0	0	35	0				63	S			685		A	Pen	7,407
14	3	0	0	P & A							L			6,585			Pen	7,407
15	38	0	x	T A						42	S			625		M C		
16	18	0	0	0	5	0				56	S			1,315				
17	5	0	0	0	0	2	570				S			2,190			Pen	8,601
18	2	0	x	0	1	0					S			575		M C		
	7,543	413	140	3,149	2,941	351												

IMPORTANT WILDCATS DRILLED IN 1949

LINE NUMBER	COUNTY OR LOCALITY	LOCATION SEC. SURVEY	LOCATION TWP. LAT.	LOCATION RGE. LONG.	TOTAL DEPTH. FT. OR METERS	FORMATION	DEEPEST HORIZON TESTED	DRILLED BY	INITIAL PRODUCTION PER DAY OIL, U.S. BBL.	INITIAL PRODUCTION PER DAY GAS, MILLIONS CU. FT.	INITIAL PRODUCTION PER DAY CONDENSATE U.S. BBL.	CHOKE, FRACTIONS OF AN INCH	PRESSURE, LB. PER SQ. IN. CASING	PRESSURE, LB. PER SQ. IN. TUBING	REMARKS
1	Chaves	23	8S	32E	12,040	Permian	Granite	Barnsdall Oil Co.							D & A
2	Chaves	26	11S	26E	6,175	Permian	Granite	Buffalo Oil Co.							D & A
3	Chaves	18	11S	27E	6,630	Permian	Granite	DeKalb Agricultural Assn.							D & A
4	Chaves	27	11S	27E	7,582	Permian	Granite	Union Oil Co. of Calif. & DeKalb Agricultural Assn							D & A
5	DeBaca	22	5N	26E	7,149	Permian	Granite	Abercrombie & Hawkins							D & A
6	DeBaca	17	2N	25E	6,174	Permian	Granite	W. Hawkins							D & A
7	Lea	2	12S	33E	11,766	Permian	Devonian	Amerada Pet. Corp	1,744						Bagley Sil/Dev
8	Lea	10	12S	33E	11,083	Permian	Devonian	Amerada Pet. Corp	285						Bagley Pen
9	Lea	12	9S	35E	9,641	Permian	Pennsylvanian	Magnolia Pet. Co	511						Bough
10	Lea	11	15S	37E	11,467	Permian	Devonian	McAlester Fuel Co	457						Denton
11	Lea	28	9S	36E	9,888	Permian	Pennsylvanian	Magnolia Pet. Co	175						Crossroads-Pen
12	Lea	15	24S	37E	9,705	Permian	Ellenberger	Stanolind Oil & Gas Co	383						Fowler
13	Lea	26	12S	33E	11,191	Permian	Devonian	Amerada Pet. Corp	971						Hightower Pool
14	Lea	35	16S	38E	12,656	Permian	Devonian	Amerada Pet. Corp	935						Knowles
15	Lea	9	10S	36E	13,123	Permian	Ellenberger	Amerada Pet. Corp							D & A
16	Lea	31	11S	35E	13,228	Permian	Devonian	Humble Oil & hefg Co							D & A
17	Lea	28	17S	32E	10,747	Permian	Pennsylvanian	Kewanee, et al							D & A
18	Lea	1	9S	36E	12,852	Permian	Devonian	Magnolia Oil Co							D & A
19	Lea	20	18S	37E	12,626	Permian	Granite	Phillips Pet. Co							D & A
20	Rio Arriba	14	25N	2W	3,492	Eocene	Upper Cre	Gardner Pet. Co		277Mcf					Gavilan
21	Rio Arriba	11	31N	6W	8,087	Eocene	Dakota	Stanolind Oil & Gas Co							D & A
22	Sandoval	7	16N	1E	2,562	Cre U	Granite	Tidewater Assoc. Oil Co							D & A
23	San Juan	10	31N	12W	5,312	Eocene	Upper Cre	Southern Union Prod. Co	4,500	Mcf					La Plata
24	Union	2	23N	33E	4,036	Cre U	Granite Wash	A. R. Dillard							D & A

The Drift of Things

. . . as followed by **EDWARD H. ROBIE**
Secretary AIME

Provided no cataclysmic acts of God or man intervene, which is by no means unlikely, the 1950 Directory of AIME members should be mailed with this issue of the JOURNAL OF PETROLEUM TECHNOLOGY. Its publication has caused more grief to the Institute's secretarial staff than anything that has happened in the last two years. One of the secretaries of the other national engineering societies suggested the other day that we all get together and compare notes as to the best method of publishing a directory, inasmuch as it seemed to be a problem for everybody. We offered to contribute a well documented memorandum on how *not* to publish one.

The 1948 Directory — the last one issued — was published in June of that year. It followed the style of previous volumes, and it cost a little more than $14,000. This year we aimed to get out a more accurate directory at materially lower cost. To make it more accurate we decided not to print it from our master file cards of members' names, positions, and addresses, since many had changed their positions without notifying us. So last March we sent a reply postal card to every member asking for his name, grade of membership, year of election, title, name of employer, address, and whether or not available for consulting work. This, we fondly thought, would give us an up-to-the-minute record of our membership which, with a little editing, we could send to the printer. But, after waiting two months, some 5,000 of our members had not returned the card. So we had to make one out for them, from our admittedly not entirely up-to-date records.

As a further improvement in the directory we decided to incorporate a company listing in the geographical section. That is, every company employing a member would be listed under the respective states and countries, with the names of the members, and their positions, listed in each town. This was intended to be a great convenience to members. We had the directory of the Society of Automotive Engineers as a model in this respect. It was a pious idea, with some devilish pitfalls.

As we have said, reduction of cost was one of our aims, and we thought we could eliminate about one-third of the former cost. We decided to omit much of the first 115 pages of the former Directory — that part devoted to medals and awards, bylaws, the annual reports, etc., which would be printed say every five years. Also to be omitted were some 40 pages devoted to Student Associates, since a large proportion of these addresses become obsolete at the end of a school year. A considerable further saving was expected by having the Directory set up on IBM electric typewriters and printed by offset. Another economy considered was the idea of sending a directory only to those who request it. This is the practice followed by the AIEE for instance, and of their 37,000 members, less than 5,000 ask to have a directory. This would mean a substantial saving but we felt that all AIME members had always received our directory and would expect one without asking for it; also that even though they might not want one now they would find it useful at certain times in the future and then would not have it, necessitating more correspondence with AIME headquarters.

Some of the reasons for delay in publication and for increases over expected costs have been indicated. There were many others. We first planned to issue the book in the spring. Then by May we hoped to have it out by Sept. 1. As we write this it is Oct. 17 and we have not seen a copy yet. As the days went by, printing and binding costs increased. The ultimate cost promises to be a little more than that for the 1948 volume.

We shall be glad to have your comments for our future guidance. The book has many good points which we shall try to continue in future editions. Its faults we shall try to avoid.

Mexico City, Oct. 28-Nov. 3, 1951

Dates have now been definitely set for the AIME Regional Meeting next year in Mexico City—Oct. 28 to Nov. 3. As already announced, the meeting will be held jointly with the Instituto Nacional para la Investigacion de Recursos Minerales, and if you can't pronounce that, or don't know what it means, then it is not too early to begin to do something about it. You will get along O.K. and have a good time in Mexico City next October if you don't know a word of Spanish, but you'll have a better time if you know a bit about how they talk south of the border.

In the week before the meeting the American Mining Congress will gather at Los Angeles — Oct. 22-24 — leaving three or four days to go from there to the capital of Mexico. Originally our meeting was tentatively scheduled for Oct. 15-20, but the American Society for Metals has now shifted its Detroit meeting to that week, and every effort is being made to avoid conflicts.

We are assured that the end of October is an ideal time to visit Mexico. The rainy season will have ended and the weather will be just right. Attractive trips will be arranged to such places as Taxco, Xochimilco, the Pyramids, San José de Purua, and to the old mining camp of Pachuca, still active. Even Paracutin, the new volcano, may be in eruption and worth a visit.

You can save enough money on Christmas presents alone to pay a good share of the expenses of the trip. Table silver, belt buckles, cuff links, tie pins, cigaret cases, compacts, perfume, tooled leather, carved wood, gold jewelry, blankets, serapes, glazed pottery are all good buys. Each person can bring back $200 worth, or $500 worth if they stay more than 12 days. See the September issue of *Esquire* as to how economical this vacation trip can be.

Just enough technical sessions to justify the trip, if you are on an expense account.

Muddled Geography

From the Baker Hotel in Dallas comes a letter which asks if we will not consider that city for a forthcoming meeting of the New England Conference of the Institute of Metals Division of the Institute. Heretofore this conference has been held in such places as Boston, Springfield, Providence, and New Haven. Doubtless Dallas offers attractions not heretofore enjoyed. How about the Petroleum Branch coming up to Boston for one of their fall meetings? Though the continental shelf along the Gulf Coast has been found to contain oil, the same shelf off New England has not yet been investigated for anything but fish.

And another convention bid: "We have just learned that your organization is planning a convention in Chicago during the month of Chicago." ★

NOTES ON THE OCTOBER EXECUTIVE COMMITTEE MEETING IN NEW ORLEANS

The open meeting of the Petroleum Branch, AIME, Executive Committee held in New Orleans October 4 and 5 was well attended by members fortunate enough to be present at the Fall Meeting. Members of the Committee in attendance included John E. Sherborne, chairman; Paul Andrews and Richard W. French, vice-chairmen; and committee members Benjamin C. Craft, John R. McMillan, Harold Decker, Lloyd E. Elkins, John H. Murrell, R. C. Earlougher, and Treasurer R. B. Gilmore.

Branch Executive Secretary Joe B. Alford reported the election of the following officers for 1951: Richard W. French, chairman; Lincoln F. Elkins and Paul Turnbull, vice-chairmen; and John S. Bell and Tom Frick, new members of the Committee. E. W. Berlin's appointment as chairman of the 1951 Production Review Committee and J. M. Bugbee's appointment as chairman of the Publications Committee for 1951 were also reported.

Owen F. Thornton, 1950 Publications Committee chairman, reported that his committee had handled 105 technical papers during his term of office. Burton Atkinson, chairman of the Membership Committee, said the Branch had secured 303 new members during the period January - August, 1950, or 31 per cent of total AIME new admissions.

The dates October 3, 4, 5 were chosen as the official dates of the 1951 Fall Meeting of the Branch in Oklahoma City, Okla.

Branch and Institute finances took up considerable time for the Committee members. Chairman Sherborne indicated there are some trends that exist in various departments toward meeting the budget for 1950. However, a minimum deficit of some $10,000 for the Branch was predicted. The chairman reported that the Branch is within its budget on those funds allocated for publication of the JOURNAL OF PETROLEUM TECHNOLOGY and operation of the Dallas office.

The Committee discussed the tentative budget for operation of the Branch in 1951 as submitted by the New York staff. This budget provides for 35 pages less of transactions material and 130 pages less of non-technical editorial material with an increase of 28 pages of advertising for 1951. The Committee decided to apprise the AIME Board of Directors of the Branch's desire to maintain the same level of publishing activity in 1951 as enjoyed in 1950.

Chairman Sherborne reported that Branch By-Laws must be changed to provide for appointment of representatives from the Mineral Industry Education Division and Mineral Economics Division as called for in the AIME By-Laws. An agreement has been worked out with the two divisions whereby the Petroleum Branch Executive Committee can approve such appointments.

The Branch commitee structure has been changed, subject to approval by the membership, whereby the Production Technology Committee was renamed the Technology Committee. The new committee will be composed of vice-chairmen for the drilling, production and gas phases of the industry, a vice-chairman being active in each field. Necessary amendments to the By-Laws will be submitted to the membership.

Secretary Alford reported that cost of publishing the 1949 statistical material in the JOURNAL will approximate $11,000 this year. Sale of bound volumes will somewhat offset the expenditure. (Since the October Executive Committee meeting, $5,000 has been made available from the Doherty Fund which will probably be used to help defray publication expenses for the statistical material.) Alford recommended that the method of publishing the data, i.e., in the JOURNAL, be repeated in 1951 if final costs warrant it.

The Committee voted to recommend Stuart E. Buckley's forthcoming volume, *Petroleum Conservation*, to the Mudd Fund as a volume to be given Petroleum Branch Junior Members upon AIME affiliation.

Formation of the Wyoming Petroleum Chapter of the Branch and the San Antonio-Austin Sub-Section of the Southwest Texas Section was announced. Claude Hocott is studying financing and organization of AIME chapters and sections using the Southern California Local Section as a model of organization structure. It is made up of three distinct subdivisions in Mining, Metals and Petroleum. Paul Andrews explained the nature of the Southern California situation. Andrews also requested, on behalf of the Pacific Petroleum Chapter, that the chapter be given complete responsibility for the sale of exhibit space and financial arrangements at the annual Branch Fall Meeting in Los Angeles. The Committee agreed that the Chapter could assume full responsibility for the sale of exhibit space for the 1951 meeting but the financial aspects of the meeting will be considered by Hocott's committee in its study of the over-all Branch policy and problem of organization and finances.

★ ★ ★

Resistivity Cards Prove Popular

Twenty-two sets of Formation Water Resistivity cards, compiled by The Atlantic Refining Co. with the aid of eight other leading companies for more efficient electric log interpretation, have been published and sold to date by the Petroleum Branch, AIME.

The sets, which sold for $30, included 1,500 cards giving data on location as to state, formation and subdivision, county, field, well, sub-sea depth, sub-surface depth, depth below top of formation, source of sample, data source and resistivity. The data were compiled throughout the Mid-Continent, Gulf Coast, Mississippi and Rocky Mountain regions.

Companies assisting Atlantic in the compilation were Stanolind Oil and Gas Co., Chemical and Geological Laboratories, Shell Oil Co., Magnolia Petroleum Co., Continental Oil Co., United Gas Co., The Texas Co., and Schlumberger Well Surveying Corp.

If further demand for the sets is expressed in sufficient volume, the Branch will consider publishing an additional number at the above quoted price.

★ ★ ★

FOR SALE

Two new 40" fluid clutch motor-driven Roberts high-speed centrifugals with Stevens mixer and framework for four machines, complete with all accessories.

New No. 12 Sweetland filter press; beverage type; 72 bronze leaves on 2" centers. Box 100, care of this publication.

Proposed for Membership
Petroleum Branch

Total AIME membership on June 30, 1950, was 16,339; in addition, 4,256 Student Associates were enrolled.

ADMISSIONS COMMITTEE

A. J. Phillips, Chairman; George B. Carless, John T. Sherman, Lloyd C. Gibson, R. D. Mollison, Plato Malozemoff, Ivan Given.

Institute members are urged to review this list as soon as the issue is received and immediately to wire the Secretary's office, night message collect, if objection is offered to the admission of any applicant. Details of the objection should follow by air mail. The Institute desires to extend its privileges to every person to whom it can be of service but does not desire to admit persons unless they are qualified.

In the following list C/S means change of status; R, reinstatement; M, member; J, Junior Member; AM, Associate Member; S, Student Associate; F, Junior Foreign Affiliate.

ARKANSAS
El Dorado — Catlin, John E. (M).

CALIFORNIA
Bakersfield — Taylor, William J. (M).
San Francisco — Lewis, John B. (M).
South Pasadena — Cook, Philip G. (A).
Taft — Daniels, David E. (J).

COLORADO
Gilman — Phillips, John S. (J).

IDAHO
Burgdorf — Harris, Bill (J).

ILLINOIS
Mt. Vernon — Moon, Daniel M. (M).

LOUISIANA
Haynesville — Krider, Eddie B. (J).
Houma — Ritch, Harold B. (A).
Lafayette — Autin, Octa (J).
Lake Charles — Bujol, Wallace C. (J).
Shreveport — Golding, Bert H. (J); Hargrove, Joseph L. (J); Harlan, William H. (J); Langston, William W. (M); McCoy, William B. (M); Organick, Elliott I. (J); Orr, Virgil (J).

MISSOURI
Webster Groves — McCullough, Campbell B. (M).

NEW MEXICO
Carlsbad — Harrison, Marvin H. (J).

OKLAHOMA
Norman — MacQueen, Peter A. (J).
Oklahoma City — Holzhauer, Earl J. (J).
Paula Valley — Base, William Robert (J).
Ponca City — Heid, James G. (J); Sheppard, Keith D. (J).
Shawnee — Williams, Weldon E. (J).
Tulsa — Behning, Paul D. (M); Bell, Archibald M. (A); Cobb, Henry E., Jr. (J); Grieves, William A. (J); Hall, Howard N. (J); Hamilton, James C. (J); Hancock, Charles W. (J); Houy, Carl A. (M); Hunt, Elton B., Jr. (M); Johnson, Donald R. (M); Jones, Jack R. (J); Spurlock, James W. (M).
Wewoka — Allen, Thomas M. (J).
Yale — Rossman, Charles C. (J).

PENNSYLVANIA
Chambersburg — Peters, James W. (J).
Fredericktown — Sherrard, Jacob H. (J).
Newtown Square — Patterson, Omar L. B. (M).

TEXAS
Austin — Gilchrist, Ralph E. (J).
Bellaire — Mackey, James L. (M).
Brownfield — Snedeker, Keith D. (M).
Bullock — Porter, William H. (M).
Cleveland — Griffing, John W. (A).
Corpus Christi — Die, Roy R. (J); Hill, Harry B., Jr. (J).
Denver City — Bevill, Ben K. (M).
Dallas — Collins, Francis A. (M); Faulk, Joseph H. (J); Grissom, Pinkney, Jr. (J); Jonsson, Philip R. (J); Kapperman, Raymond V. (J); Lewelling, Henry (M); Linder, John D. (J); Moore, Thomas F. (J); Wyant, Reece E. (J).
Fort Worth — Gilbreth, Oma K., Jr. (J); McCoy, William G. (J); Terry, Joe B. (J).
Gonzales — Deschner, Henry W. (J).
Henderson — Olson, Charles R. (J).
Houston — Baboin, Guy E. (M); Fay, Charles H. (M); Graham, James R. (J); Hansen, Raymond S. (J); Schuleman, School (J).
Iraan — Alexander, William J. (J).
Kilgore — Martin, Ewell B. (J).
Levelland — Winterbauer, Edward L. (J).
Longview — Bander, Joseph H. (J).
Lubbock — Nelson, Frederick D. (M).
Midland — Yuronka, John, Jr. (J).
Pleasanton — Richards, William E. (M).
San Antonio — Amyx, James W., Jr. (J); Bellis, Lewis C. (J); Chin, Wai S. (J); Moore, Arnold R. (A); Pyron, Walter B. (M).
Seminole — Gordon, Reynolds V. (J).
Tyler — Lipstate, Eugene (J).
Webster — Kobayashi, Riki (J).
West Columbia — Mitchell, William H. (A).

WASHINGTON
Pasco — Parkman, Malcolm F. (J).

WYOMING
Casper — Sylvester, William C. (J).
Grass Creek — Brumberg, Robert W. (J).

CANADA
Alberta — Stamm, Roy P. (J).

CHILI
Chuquicamata — Hare, Harold J. (M).

COLOMBIA
Cucuta — Wall, Thomas G. (J).

VENEZUELA
Caracas — McLay, James H. (M). ★ ★ ★

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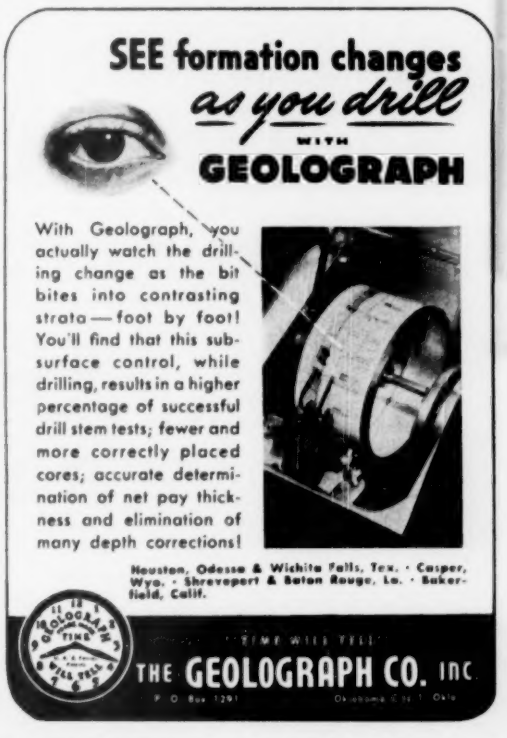
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Employment Notices

The JOURNAL will post notices of men and jobs available. Companies and AIME members are invited to use this space, for which there is no charge. Except as noted below, address replies to: Code (appropriate number), JOURNAL OF PETROLEUM TECHNOLOGY, 601 Continental Bldg., Dallas 1. Show return address on envelope. These replies will be forwarded unopened and no fees are involved.

Replies to the personnel coded M-596, Y4244 and Y3989 below should be addressed to: Engineering Societies Personnel Service, 8 West 40th St., New York 18, N. Y. The ESPS, on whose behalf these notices are published here, collects a fee from applicants actually placed.

PERSONNEL

♦ Petroleum reservoir engineer, 33, desires responsible work in evaluation, reserves, and subsurface studies. No research. Limited experience in all phases drilling and production. Formerly division reservoir engineer for major oil company. Now employed. Prefer Houston employment but will consider other areas. All replies acknowledged. Code 140.

♦ Experienced geophysicist, some experience in spectroscopy (emission) and petrography. Geological background. Desires employment in New York or New Jersey area. M-596.

♦ Geologist for staff position in research laboratory, to act as geologist, sedimentologist in connection with oil field secondary recovery project. Location, western Pennsylvania. Y4244.

♦ Geophysicist experienced in the interpretation of seismograms of poor quality, for work consisting mostly of re-interpretation of seismograms, which is almost all office work. Should be willing to do field work if required. Salary, $10,800 a year. Location, South America. Y3989.

POSITIONS

♦ Staff vacancies in the Petroleum and Natural Gas Engineering Division of Pennsylvania State College include opportunities for Ph.D. men who can supervise research in petroleum production, drilling, and natural gas engineering, as well as teaching undergraduate and graduate level courses; MS men capable of some research supervision and possible teaching; and BS men as laboratory technologists. BS and MS men may enroll for six credits of graduate study per semester. Interested persons give full record of experience, education, salary and rank desired. All appointments on a 12-month basis. Code 525.

♦ Sales engineers, to be located in Southwest for promotion of a chemical used in oil well drilling. Chemical, petroleum or civil engineers may qualify. Salary $6,000 to $7,200. Full-time job. Code 526. ★ ★ ★

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In Reply —

- Give *complete* synopsis of training and experience. Replies which do not give this synopsis will not be considered.
- State salary desired.
- Supply recent photograph if possible.

And Address to —

Code 523
Journal of Petroleum Technology
601 Continental Building
Dallas, Texas

ALL REPLIES WILL BE HELD IN STRICT CONFIDENCE

Technical Movies For Local Sections

The possibilities and advantages of presenting technical movies at local section meetings was illustrated at the Petroleum Branch Fall Meeting in New Orleans in early October when C. E. Williams, Jr., and G. H. Bruce, of Humble Oil and Refining Co., presented their paper, "Carrying Capacity of Drilling Fluids," at one of the sessions.

Some of those who attended that particular technical session are still talking of the extraordinary movies the authors used to illustrate their paper. Most agreed that the movies were instructive and educational. In October, the JOURNAL OF PETROLEUM TECHNOLOGY published six reviews of movies which deal with petroleum production, exploration or drilling. It was hoped at the time that local sections might take advantage of the availability of these movies and show them before regular monthly meetings.

Concerning the above paper by Williams and Bruce, one member remarked that "you can read all the papers at home and save the money and time spent attending the meeting, but you can't see such movies which provide visualization and real comprehension of some of our most important technical investigations of practical field use anywhere except at the meeting."

'SPECIALISTS'

Continued from Page 8, Section 1

industry and to assist in clarifying existing misconceptions. For example, the public may not fully appreciate all the effort put forth to add new reserves and to increase recoveries from existing reserves so that the public will have a continuing supply of oil — that the natural reserves are irreplacable. The engineer or geologist is better prepared to be convincing on this subject than anyone else in the industry, but he needs to train himself to speak and write clearly and concisely.

He should also familiarize himself sufficiently with all of our industry's problems to be able to recognize and, when opportunity arises, to refute false and self-serving charges against the industry by politicians who seek to misinform and mislead the public.

If the specialist is found wanting it may be because those who are responsible for his industry training and guidance have not fulfilled their obligation. ★ ★ ★

Pipe In Short Supply?

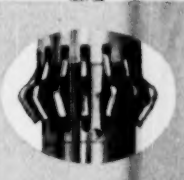
Otis Tubing Caliper Determines Extent of Internal Corrosion

Wire Line Operations Permit Surveys Under Pressure, Without Killing Well or Pulling String For Surface Inspection

Faced with a possible shortage of tubular goods, many operators are keeping a closer check on the internal condition of tubing and casing in wells located in corrosive fields.

Tubing corrosion surveys by Otis Pressure Control are made under full shut-in well pressures and do not necessitate killing the well or pulling the string for surface inspection. Experienced Otis Caliper crews, including an engineer and wire line specialist, are available for immediate dispatching from 11 Otis offices. Crews can submit a preliminary interpretation of the general condition of the string and a list of bad joints immediately after the well is calipered. Otis crews have a complete set of calipering instruments to survey all standard sizes of tubing from 1½-in. to 4-in., and casing from 5½-in to 8⅝-in. As many as 30,000 feet of tubing can be surveyed in a single day's operation. Literature containing complete details is available from any Otis office.

Closely-spaced spring-loaded feelers press against the inside area of the pipe wall; when a corrosion pit is encountered, direct action causes a rotating stylus to plot the location on a metal chart inside of the Caliper. The depth of the pits determines the extent of the log marks.



Included in each well report is an easy-to-read, double-size photostat of the Caliper log. Each joint in the string is numbered and badly corroded joints can be determined at a glance.

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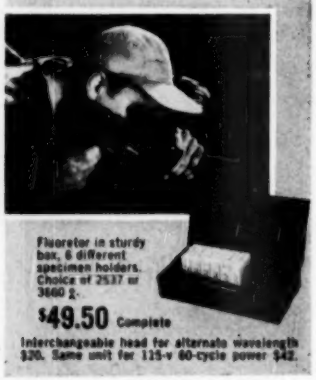

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Personals

R. F. Baker, vice-president and director of The Texas Co., New York, has been elected a director of the American Standards Association. As vice-president and director of The Texas Co., he has been in close touch with the extensive standardization of oil field equipment, machinery and supplies. For several years before going to New York, he was with The Texas Co. in Oklahoma and Texas. He was nominated for his new position with the ASA by the American Petroleum Institute.

+

Rex E. Cheek, field engineer for the Stanolind Oil and Gas Co., Oklahoma City, was recently transferred from the Hugoton area, Ulysses, Kansas, to the West Edmond area, Oklahoma City. The work in this area will be predominantly oil development and production.

+

Wm. L. Horner has been made chief petroleum engineer for the Sunray Oil Corp., Tulsa. He was formerly chief engineer for the Barnsdall Oil Co.

+

John Austin Jones is now connected with the National Associated Petroleum Co., Washington, Ind., as a petroleum engineer.

+

James L. Kincaid has joined C. T. McLaughlin, Snyder, Texas, as superintendent. He previously held the position of production engineer with the Pure Oil Co.

+

Gordon G. Lancaster is now in the Marine Corps Reserve. He was formerly petroleum engineer for the Sun Oil Co., Dallas.

+

Edwin Poulter is now petroleum engineer with the Star Oil Co., Graham, Tex.

+

Ashley H. Priddy is now associated with Sabine Royalty Corp., Dallas, Tex., as a junior petroleum engineer.

Leigh S. McCaslin, Jr., has been granted a professional degree in mechanical engineering from Oklahoma A&M College. Subject of his thesis was "A New Pioneering Development in Mechanical Engineering — Drilling for and Producing Oil from Offshore Areas."

+

Glenn R. Schimmel, Jr., recently graduated from Texas A&M College, is now working with Ryan, Hays & Burke, Midland oil operators.

+

Paul N. Weidner has become affiliated with the Creole Petroleum Corp., Caracas, Venezuela.

+

Wilford Lee Stapp is now a district geologist for the Sunray Oil Corp., Abilene, Tex.

+

Gene L. Scheirman has been transferred from junior exploitation engineer, Shell Oil Co., Houston, to exploitation engineer (division) at Kilgore, Tex.

+

Edward Trafford is no longer associated with Shell Oil Co. He has accepted the position of manager of Home Oil Co., Ltd., Calgary, Alberta.

+

George Calleya is now connected with the Canadian Fina Oil Ltd., Calgary, Alberta.

+

James D. Murdoch, Jr., formerly with Major Distributors, Ltd., Edmonton, Alberta, is now with British American Oil Co., Ltd., Fairview, Alberta.

+

J. R. Maxey, former chief geophysicist for the Deep Rock Oil Corp., has entered the consulting business in Tulsa, Okla., specializing in review and evaluation of seismic and geological prospects. Previous to going with Deep Rock, he had been connected with Humble Oil and Refining Co., The Carter Oil Co., Sohio Petroleum Co., and United Geophysical Co. He has a Master of Science degree in geology from the University of Oklahoma.

NEW POLICY FOR STUDENT GROUPS

A new policy as to the recognition of AIME Student Chapters has been voted by the Board of Directors.

Because the activity of many Student Chapters has been intermittent, they will hereafter be recognized for only a year at a time, such recognition being subject each year to the approval of the Local Section in whose territory the Student Chapter is located. The Local Section will also assist the Chapter in every way it can, and will seek to reactivate a Chapter that has become inactive if it feels that good can be accomplished thereby. A folder containing material useful to Local Sections in their contact with Student Chapters has recently been prepared and is available from Institute headquarters.

★ ★ ★

No Price Change For JPT in 1951

In order to lighten the peak load at AIME headquarters at the end of the year, and assure prompt mailing of 1951 membership cards, statements of 1951 dues are being mailed to AIME members by groups in the closing months of 1950. Despite increased printing costs, no change is being made in the subscription prices of the journals or *Transactions* volumes for the coming year. Each paid-up Institute member (except Student Associates paying $2) will receive an annual subscription to one of the journals without further charge. Nonmember subscriptions are $8 domestic and in the Americas and $9 elsewhere. To comply with postal requirements $6 of the annual membership fee is credited as a subscription to a journal ($4 for Student Associates).

If a member wishes to receive another journal he may be put on the subscription list by payment of an additional $4, or for $8 additional he may receive all three journals. However, if two or more copies of the same journal are desired, the nonmember rates apply for the additional subscriptions. *Transactions* volumes, which are reprints of the *Transactions* sections of the monthly journals, are $3.50 each when payment is made for them in advance of publication along with dues; otherwise they are billed at the regular price of $7, less a 30 per cent discount to members. As was the case last year, three *Transactions* volumes will be issued early in the year, covering all the material that appeared in 1950, one each for the Mining, Metals, and Petroleum Branches. This year the material contained in the former annual Petroleum Statistics volumes is being printed from month to month in the JOURNAL OF PETROLEUM TECHNOLOGY, but those who wish the bound volume in addition may purchase it for $3 to members, and $6 to nonmembers. It should be available early in 1951.

★ ★ ★

J. D. Francis Named 1951 Rand Medalist

James Draper Francis of Huntington, W. Va., chairman of the board of the Island Creek Coal Co. and the Pond Creek Coal Co., has been named as the recipient of the Rand Medal for 1951. The medal is given by the AIME for distinguished achievement in mining administration, mining to be considered in the broad sense to include metallurgy and petroleum. It will be awarded to Francis at the Annual Banquet of the Institute in St. Louis Feb. 21, 1951.

The citation reads: "For successfully administering coal properties for more than 35 years until these two companies have become one of the largest and most successful units in the coal industry; for opening and managing new properties, for improvements in marketing and business methods, for his general interest in all industrial matters, his continued interest in research, and his excellent citizenship in promoting not only his own but all other interests in his general community."

★ ★ ★

Status of Members Eligible for Draft

As a result of several requests from young men currently being inducted into military service that their membership in the AIME be put on an inactive status, the following procedure was authorized by the Executive and Finance Committees:

Upon individual request from members and Student Associates entering military service in the present emergency, the Secretary is directed to offer temporary suspension of their AIME membership until such time as they may re-enter professional work. No membership fees will be charged and none of the usual privileges of membership will be extended, but the member's original election date will be preserved, and he will be entitled to any credits that may be authorized on initiation fees for continuous dues-paying membership.

★ ★ ★

SULFUR and CARBON *Analyses* in PETROLEUM PRODUCTS

The sulfur content of oils, waxes and greases is an important measure of the value and quality of the product.

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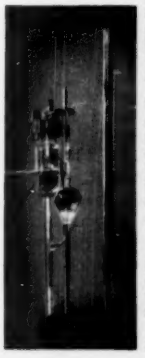

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CANADIAN OIL DEVELOPMENT

Continued from Page 12, Section 1

be desirable to reduce the field price to provide inducement to refinery construction and thus obtain a market large enough to justify the reduction.

It would seem that with the North Central United States a deficit area in which crude discoveries are unlikely and which is adjacent to a large and established crude movement from the Canadian Prairies to the Ontario market, consideration of the overall continental supply interest might indicate the desirability of utilizing Canadian crude in the Minneapolis area leaving United States domestic crude to move to the East Coast or to look after the increasing demand. By so doing, important transportation economies might be achieved which would be of mutual advantage to both the United States and Canadian oil economies.

The chief obstacle to the use of Prairie crude moved by tanker to the United States refineries on the Great Lakes is the investment required for storage to provide for year-round operation. Their present supply is by pipeline.

The last remaining market is further east and is the Canadian refining center of Montreal where 40 per cent of Canada's refining capacity amounting to 130,000 B/D is located. The chief obstacles to a movement to this market are the lower competitive crude levels resulting from greater accessibility to the Caribbean area and the large pipeline investment. However, in lieu of more attractive markets, it is possible that with a large volume movement based on saturating the Ontario market and moving some 100,000 B/D to Montreal, transportation economies can be effected which will permit Prairie oil to compete on a basis attractive to the Alberta producer. The development of the St. Lawrence waterways might eliminate the need for a pipeline and facilitate the use of Prairie crude.

Many Factors to Determine Market

Beyond this broad discussion of the general situation it would be unprofitable to speculate more definitively on which market or combination of markets will ultimately be the outlet for Prairie crude. These will be determined by the competitive and supply situations at the time when the outlet is required and by other factors such as the continental supply and demand situation, tariff developments, strategic considerations, and the rate and size of future discoveries both in the United States and in Canada. However, there are several general statements which appear warranted:

1. Preliminary investigation indicates that the Alberta field price required to compete in the various possible markets does not vary greatly between markets.
2. While pipeline investments to reach the markets vary, the difference may not be significant since tariffs provide for a return on the investment.
3. After the saturation of the Ontario market, the effect on Canadian crude of any changes in the United States tariff will probably be the same for all destinations, that is, assuming that Caribbean supplies are priced to reflect such a development.
4. There are substantial differences in the size of markets — the West Coast being the biggest. On the other hand, the largest amount of refinery capacity in existence at the present time is at Montreal. For both West Coast and Minneapolis a substantial refinery investment must be made to provide a sizable crude outlet. However, in the future Prairie crude may prove to be the most logical supply to these markets and it may be desirable from an overall supply standpoint for it to be priced at the level necessary to provide the inducement for the required refinery investment. In view of the large annual growth in continental demand the opportunity should readily occur for a re-location of capacity to conform with a more favorable supply.
5. The North American continent should be viewed as a unit from an oil supply standpoint. It is generally recognized that imports to the continental area will be necessary from now on to supplement domestic production. It would seem that these imports should be determined on the basis of the overall economy having regard to a prudent level of production from reserves.

From a continental standpoint it would seem that the pattern of supply should develop on the basis of using available reserves within the area to the best advantage. In general, this means minimum transportation between the producing area and the market, and the developing of supply lines based on competitive forces rather than artificial regulation such as may result from tariff or sectional considerations. These may distort supply lines in an undesirable and uneconomical fashion delaying the achievement of the most efficient system. Competition is a concept of the free enterprise system which has played a prominent part in the development of the oil industry — it has prospered most when it has functioned freely.

Large Reserves Seen

In the last analysis it appears immaterial from a supply standpoint whether Prairie crude is absorbed in the Canadian or the United States market. The object should be that whatever pattern of supply develops it should conform to the long term mutual interest of minimizing unnecessary transportation. By so doing, the maximum incentive to explore and find oil within the continental area will be maintained and the public interest of obtaining the most economical supplies will be recognized.

Looking further into the future it would seem quite possible that on the basis of the present activity and the area prospects, reserves of between five and 20 billion bbl might be proved up in the Western Canadian basin. Assuming that five billion bbl of reserves are found, a production of 600-700,000 B/D may be envisaged on the basis of five per cent producibility. This volume, large as it appears in terms of the Canadian requirements at the present time, is small relative to the overall continental demand being approximately equal to the United States increased from 1949 to 1950. It would seem safe to predict that by the time this volume is achieved there will be a definite need based on its efficient and economical use.

Undoubtedly, strategic considerations will be a major factor in the future economic development of the continent. It is logical to assume that with defense and armament needs playing so large a part in the economy a strategic pattern of development will be followed which permits attaining the maximum potential for the continental area. The discovery of oil in Canada in supplementing existing reserves will further this objective.

In conclusion, the discovery of Leduc in 1947 has led to the development of important oil reserves in the Canadian Prairies. There is reason to believe that the successes to date will be the forerunner of other important discoveries which will increase these reserves materially. If these hopes are fulfilled, Canadian crude would appear to fit into a logical pattern of continental supply based on its economic and competitive development. This objective recognizes the best interests of the Canadian and United States economies and of their respective oil industries. ★ ★ ★

PUBLICATION OF TABULAR DATA

One of the greatest problems in publishing technical material is that of space allocation and conservation without impairing the technical paper itself. It has been suggested that the AIME should use the American Documentation Institute more freely in the presentation of its technical literature.

The ADI, by way of introduction, was organized in 1937 as "a non-profit corporation for the promotion and development of documentation in scholarly and scientific fields." Its address is Science Service Bldg., 1719 N St., Northwest, Washington 6, D. C.

If a technical paper is submitted for publication in the JOURNAL OF PETROLEUM TECHNOLOGY, the Publications Committee must necessarily consider the length of the paper and the volume of technical data in tabular form that accompanies it. Oftentimes, lengthy tabular material is necessary only for the purpose of making the particular study a complete one and for presenting logical background material. The same is sometimes true of maps and charts.

That, essentially, is where the ADI figures into the procedure. The ADI will basically accept such tabular material, charts and/or maps free of charge to the publication or organization, put them on microfilm and assign a documentation number to the material. If the service is used, the documentation number is placed in the reference of the paper and interested readers may, for a fee, be supplied the information from the ADI upon request.

An example of this may be found in the technical paper written by H. H. Reamer and B. H. Sage entitled "Volumetric Behavior of Oil and Gas from a Louisiana Field." The paper appeared in the September issue of the JOURNAL OF PETROLEUM TECHNOLOGY in the *Transactions* section. Reference 18 calls the readers' attention to Document 2920. ★ ★ ★

AIME Relations With Local Sections

Many AIME members are not clear as to their affiliation with local sections of the Institute. In all, there are 43 local sections in the United States, plus three others in the Philippines, Mexico, and Brazil, respectively. Each of these local sections covers a certain geographical area. The only areas not included in local sections, as currently constituted, are New York State outside of a radius of 50 miles of New York City; a part of Eastern Pennsylvania and Southern Delaware, North and South Carolina, Iowa, Nebraska, North Dakota and the eastern part of South Dakota, and Northern New Mexico.

An AIME member is automatically considered a member of the appropriate local section in whose territory he maintains a mailing address. Some local sections, however, have local dues, essentially to cover the cost of printing and mailing notices of meetings, and only those who pay these local dues are considered active members of the section.

It sometimes happens that a member may be more interested in the programs of a neighboring section than in those of his own, or may wish to receive notices of meetings of another section in whose territory he may often be. In such cases he may ask to join other local sections than his own. It is only necessary to write to the secretary of the section, whose name and address will be found on pages xxiv to xxxi of the current 1950 Directory, and ask to be included in his mailing list. He may likewise ask the secretary of his own local section to have his name dropped from the mailing list, if he is not interested in the subject of their meetings. In the eyes of Institute headquarters, however, it is not practical to portion members to local sections except on a strict geographical basis. ★

1949 Statistics Books Available Feb. 1

Bound volumes of *Statistics of Oil and Gas Development and Production During 1949* will be available around Feb. 1, 1951, and orders should be directed to the Petroleum Branch, AIME, Dallas 1, Texas. Binding work will begin immediately following publication in the JOURNAL OF PETROLEUM TECHNOLOGY of the remaining statistical material not yet published. The December issue of the JOURNAL will conclude the 1949 production and development figures.

The bound volumes may be purchased for $6 by non-members of AIME, whereas members will receive a 30 per cent discount ($4.20). Due to the present policy of publishing this statistical material monthly in the JOURNAL, only a limited number of volumes will be bound. Those who want the bound volume should order them quickly. ★ ★ ★

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. . . and

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PETROLEUM BRANCH MEETING CALENDAR

NOVEMBER Through APRIL

NOVEMBER

15	Kansas Section
16	South Plains Sub-Section
16	Oklahoma City Section
21	Gulf Coast Section
27	Pacific Petroleum Chapter
27	Permian Basin Section

DECEMBER

1-2	Joint Meeting, Texas Local Sections, Texas Technological College, Lubbock.
1	Mississippi Sub-Section
7	Illinois Basin Chapter
11	Mid-Continent Section
12	Gulf Coast Section
12	Delta Section
14	Pacific Junior Group
20	Kansas Section
21	South Plains Sub-Section
21	Oklahoma City Section

JANUARY

4	Illinois Basin Chapter
8	Mid-Continent Section
9	Delta Section
10	Southwest Texas Section
17	Kansas Section
18	Oklahoma City Section
22	Pacific Petroleum Chapter

FEBRUARY

1	Illinois Basin Chapter
12	Mid-Continent Section
13	Delta Section
14	Southwest Texas Section
15	South Plains Sub-Section
15	Oklahoma City Section
19-22	AIME ANNUAL MEETING, Statler Hotel, St. Louis, Mo.
26	Pacific Petroleum Chapter

MARCH

1	Illinois Basin Chapter
12	Mid-Continent Section
13	Delta Section
14	Southwest Texas Section
15	South Plains Sub-Section
15	Oklahoma City Section
21	Kansas Section
26	Pacific Petroleum Chapter

APRIL

5	Illinois Basin Chapter
9	Mid-Continent Section
10	Delta Section
11	Southwest Texas Section
18	Kansas Section
19	South Plains Sub-Section
19	Oklahoma City Section
23	Pacific Petroleum Chapter

BLACK MAGIC pumps $109,096 additional profit out of identical well...

RESERVOIR DATA is the same:	STARCH BASE WELL	BLACK MAGIC WELL
Completion date	9/1/46	9/25/46
Sand thickness	450'	450'
Static pressure (p.s.i.)	520	520
Gas-Oil ratio	500	500
Tubing size	3"	3"
Liner perforation (mesh slots)	50 & 60	50 & 60
Pump capacity (B/D)	400	400
API gravity	23.6°	23.6°
PRODUCTION DATA differs:		
Initial productivity index	1.24	1.93
Initial production (B/D)	275	385
Rate as of 1/1/50 (B/D)	150	200
Cumulative production to 1/1/50 (Bbls.)	260,421	314,969
Additional barrels to date		**54,548**

The size of these two wells, drilled with bottoms only 160 feet apart in the Wilmington field in California, is especially significant because one was completed with a starch-base, clay-water mud while the other was completed with Black Magic oil base drilling fluid. Their correlative electric logs, porosities and permeabilities are identical. The same stratographic interval is opew in each well. Both wells are and have been produced at capacity. They differ only in the muds used during completion. Their production figures speak for themselves. In three years and three months, Black Magic has outproduced its rival by 54,548 barrels. Using $2 as an average price per barrel, the additional profit realized is $109,096.

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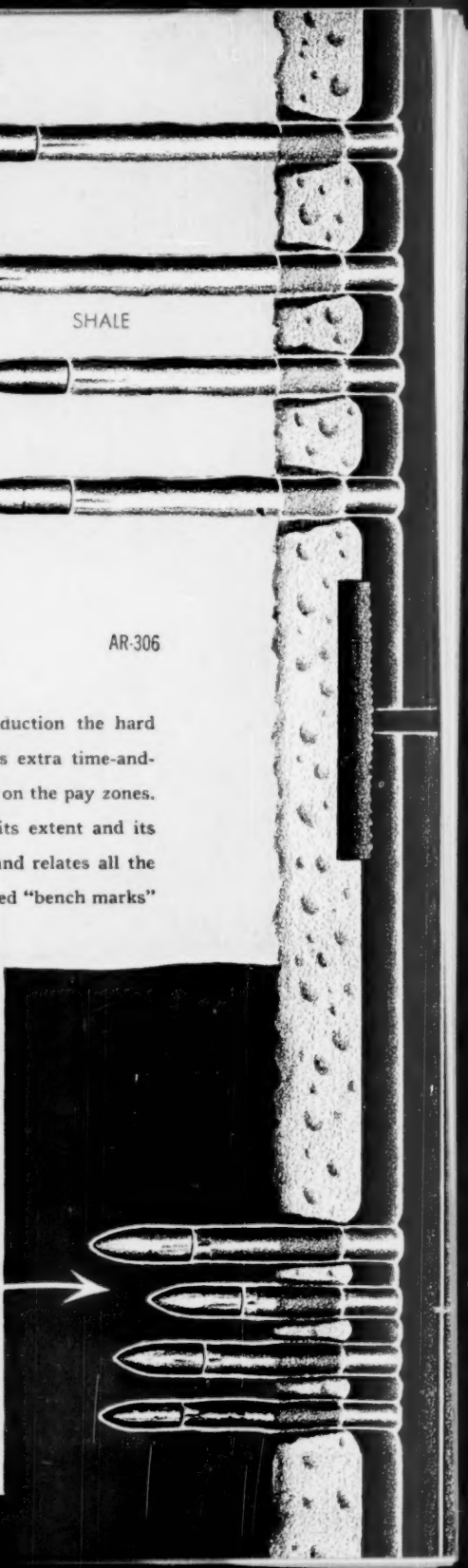
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